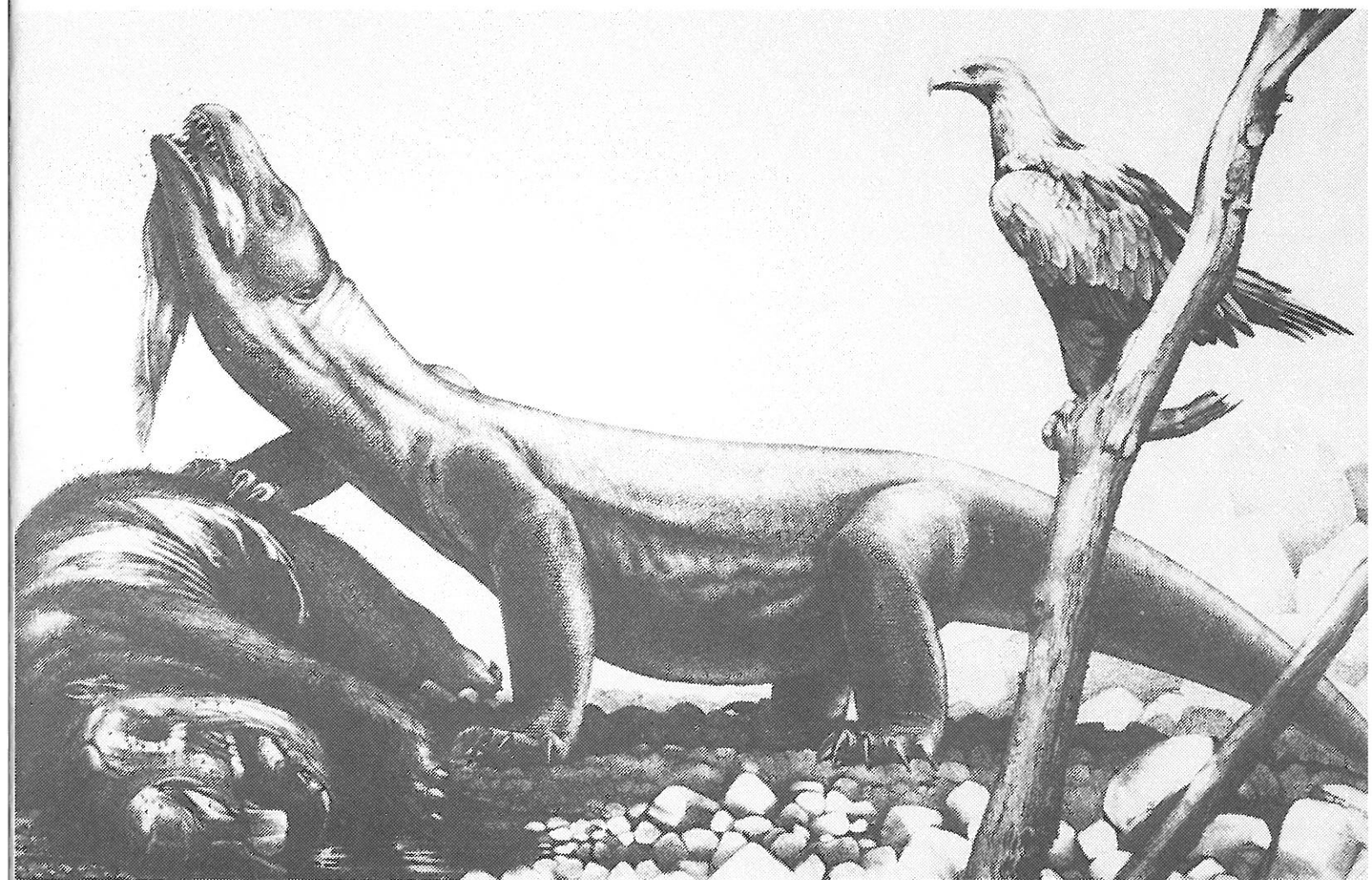


Professor M Williams,
Dept of Geography,
Monash University,
CLAYTON, VIC, 3168.

Quaternary Australasia

The Newsletter of the Australasian Quaternary Association



Volume 6, Number 2
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! Material for the next issue should reach me before 31 May !
! 1989. If possible, material should be camera-ready, single- !
! spaced with double spacing between paragraphs. !
! !
! Robert W. Galloway !
! Editor, Quaternary Australasia, !
! c/- Division of Water Resources, !
! GPO Box 1666, !
! Canberra, ACT 2601. !
! Tel.: (062)465715 (office) !
! (062)512501 (home) !
! Fax: 479958 !

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. It holds biennial meetings and publishes the Newsletter 'QUATERNARY AUSTRALASIA' twice a year. The annual subscription is \$A 20 or \$10 for students and retired persons. President 1987-1989 is Dr. Robert W. Galloway, c/- Division of Water Resources, CSIRO, GPO Box 1666, Canberra, ACT 2601.

Cover Megalania prisca Owen 1860. A giant goanna, 5.5m long. Drawing by Peter Schouten in 'Prehistoric Animals of Australia' ed. S. Quirk and M. Archer. Price \$12.95 plus \$2.50 postage and handling from: The Manager, Australian Museum Shop, 6-8 College St., Sydney.

EDITORIAL: QUATERNARY RESEARCH AND THE "GREENHOUSE EFFECT"

The so-called "greenhouse effect" is very much in the public eye just now. Publication of the proceedings of the 1987 conference in Melbourne[†], a series of television and newspaper commentaries, and the recent linked conferences in major cities under the aegis of the Commission for the Future have had a big impact on public consciousness. Recent phenomena such as the drought in the U.S.A. and an unusually mild winter in the Australian ski fields have led some people to claim that the effects are already apparent. Substantial investments in tourism, recreation, real estate and insurance are involved. Quaternary research can contribute to this important matter.

at those times
Conditions during the post-glacial thermal maximum and other warm periods such as the early middle ages offer analogies for a possible "greenhouse" warmer world. Determination of sea level, shore line position, timber line altitude, plant distributions and phenology *L* could assist in assessing possible future "greenhouse" effects.

Even more importantly, Quaternary studies can help us to decide if a Greenhouse effect is going to happen. Recent analysis of air bubbles in polar ice cores has convincingly shown that the CO₂ content of the atmosphere was low during Pleistocene glacial stages and high during interglacials. What has not yet been demonstrated is which was cause and which effect or whether (more likely in my opinion) both CO₂ and temperature changes were produced by some other cause. Closer dating of the evidence will help to resolve this chicken-and-egg problem. A prominent overseas climatologist (in a letter to me) has stated that the rapid increase in atmospheric CO₂ followed global warming and was followed by stable temperature. He also points out that models used to predict conditions several decades from now cannot even predict conditions next year and have not been very successful at simulating the past. The models take no account of aerosols which are largely dependant *** on the incidence of unpredicted volcanic eruptions and whose effects can overwhelm those due to CO₂ changes.

What is at stake is not only the future of the Commission for the Future and decisions on substantial investments, but also the credibility of scientific predictions. While the public has forgotten the predictions of an imminent return to the ice age that were current in the early to mid 1970s, the Greenhouse warming is now so firmly rooted in the public consciousness that its non-arrival will seriously damage the status of all environmental sciences and other predictions they may make will be received with scepticism or indifference. As Quaternarists we must constantly stress the uncertainties in any prediction and continually seek new evidence from the past which may validate or correct the models used to predict the future.

Robert W. Galloway.

[†] Greenhouse: Planning for Climate Change. Ed. G.I. Pearman. CSIRO Division of Atmospheric Research and E.J. Brill, Leiden. xv + 752 pp. A\$70.

AQUA

The following reports by President, Treasurer and Editor will be presented at the AQUA meeting at Myall Lakes 31 January to 3 February 1989. In order that members can receive their copy of "Q.A." before this meeting, the reports do not cover the entire period of office of the present committee which ends in May 1989. A new committee will be appointed at the Myall Lakes meeting: IDEAS! VOLOUNTEERS!! PLEASE!!!

PRESIDENTS REPORT

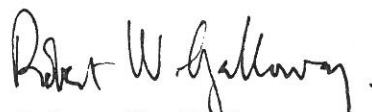
Since the last AQUA meeting at Mt. Gambier in February 1987, the Australasian Quaternary Association has stabilised at a total membership of around 150. The committee has been involved in a number of relevant issues, as outlined in "Q.A." Vol. 6, No.1, p. 2, including the question of a constitution, insurance, the Geoscience Council and a student award.

The two years have seen numerous conferences and meetings relevant to study of the Quaternary and also the very successful Ottawa meeting of INQUA. During the period there has been steady progress in Quaternary research and increasing involvement in many socially and economically important issues, such as the Helsham Forestry Enquiry in Tasmania and the Greenhouse Effect. Members of our Association have made significant contributions in these fields. The period has also seen the establishment of a Canberra Quaternary Group which is designed to promote discussion of current work in the region's Quaternary community.

Our finances are now in a very healthy state and we can grant some modest support for student research. This matter will be discussed at the coming meeting at Myall Lakes (31 January to 3 February) and the following suggestions considered:-

- (1) \$50 for the best student presentation at the conference.
- (2) Payment up to \$500 for dating, or
- (3) Travel grant, or
- (4) Helping out with page charges for publication, or
- (5) Any other ideas.

I have enjoyed my term as President and am grateful for the support of the committee and members of AQUA. I wish ~~my~~ the next President good luck. Two of his or her biggest tasks will be to improve our links with New Zealand and to find a successor! While an Australian bid for an INQUA Congress is unlikely before the end of the 1990s, a regional meeting could well eventuate and will be a big challenge and opportunity for our Association.



Robert W. Galloway,
President, AQUA.

AUSTRALASIAN QUATERNARY ASSOCIATION

Treasurers Report

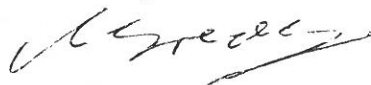
This has been another good year financially for the association. Membership for the year stood at 125 full members, 16 concessional members and 25 library subscribers. Membership has been fairly static over the last three years with a close balance between new members and resignations. Due to University cost cutting measures we have lost several library subscriptions. Fortunately they were almost balanced by new requests. The introduction of a concessional membership of \$10 per annum for students, unemployed and retired members has not been at a significant financial cost as it has encouraged maintenance of membership.

Over the last three years we have been able to steadily increase our credit balance to build up funds for the introduction of a student award and enable us to seriously consider the introduction of a Quaternary journal. However, the small size of our membership and the difficulty of obtaining library subscriptions in the prevailing economic climate should be kept firmly in mind if the membership should decide to go ahead with such a project.

During the year our membership address list has been computerised and this has made it easier to provide address labels and to keep it up to date.

I have now been treasurer for three years and will be more than willing to hand over to another if any volunteers step forward at the Hunter Valley meeting. However, if no-one is found, I will be prepared to carry on in the position for another two years.

A. Goede,
Hon. Treasurer, AQUA

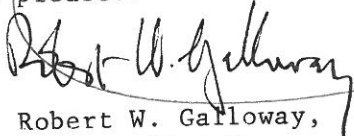


EDITORS REPORT

The newsletter, "Quaternary Australasia" has now reverted to two issues per year. It continues to receive support from subscribers in the shape of contributions usually extracted without too much editorial arm-twisting. This support is, of course, vital for the continuation of Q.A.

Although the cost per issue continues to rise, we should be able to continue publishing without increasing the subscription for the foreseeable future. I do not feel that our society is strong enough to contemplate transforming the newsletter into a proper scientific journal and possibly the market for such a journal is being overtaken by the development of computer 'bulleting boards' and other electronic means of publication.

I shall be able to carry on as editor only until the end of 1989 when I expect to fully retire. Anyone with editorial aspirations could find it an interesting and not ^{too} onerous job with liberty to run the newsletter in any way he or she pleases.


Robert W. Garloway,
Editor, "Q.A."

AUSTRALASIAN QUATERNARY ASSOCIATION

Statement of receipts and payments from 1 January to 23 November, 1988.

	\$	\$	\$
Uncommitted balance brought forward from 1987			7862.92CR

Add Receipts

Personal subscriptions (1987)	40.00	
Personal subscriptions (1988)	2604.58	
Personal subscriptions (1989)	40.00	
Institutional subscriptions (1987)	20.00	
Institutional subscriptions (1988)	473.99	
Institutional subscriptions (1989)	20.00	
Bank Interest	975.33	
Sale of publications	20.00	
Transfer ANU AQUA funds	367.67	
	4561.57	

Deduct Payments

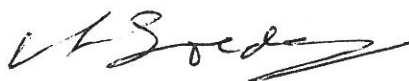
Printing costs (Q.A.)	1020.00	
Photocopying	10.45	
Address labels	2.85	
Duties and Taxes	12.32	
Postage	355.08	
Computerised address list	35.00	
P.O. Box (Sandy Bay)	23.00	
Stationary	40.60	
	1499.30	

Excess receipts over payments	3062.27	3062.27CR
		10925.19CR

Amounts held in various accounts at 23 November, 1987

Savings and Loans Credit Union - 6 months term deposit	10000.00
Savings and Loans Credit Union - on call savings account	34.98
Westpac cheque account	890.21
	10925.19

Signed:



A. Goede, Honorary Treasurer, AQUA

CONFERENCE ON THE CENOZOIC OF THE AUSTRALIAN REGION

December 7-11, 1987

Warrnambool

Approximately 100 people involved in the Cenozoic met for five days in early December, 1987 for a "re-appraisal of the evidence" relating to the Cenozoic of the Australian region. The conference venue was the Warrnambool Institute of Advanced Education, in that part of Victoria which bears clear signs of Cenozoic volcanic activity, including many maar lakes with long palaeoenvironmental records.

More than 30 speakers presented information on a wide range of Australian environments, at varying scales of time and space. Topics such as marine geology, Tertiary stage classifications, Cenozoic sea level curves, terrestrial stratigraphy, the economic potential of lakes, climatic change, and aspects of Australian volcanism give a feel for the range of material covered.

Despite the obvious range of scales employed, most speakers aimed to "reassess the evidence" either in the context of a personal viewpoint on a particular model or some aspect of the Cenozoic, or in an attempt to "stand back" and review the evidence to date. A group from BMR argued strongly for much greater Australian involvement in the Ocean Drilling Program (ODP), especially in the light of the forthcoming visit to Australian waters of a deep ocean drilling vessel. A convincing case was put for the uniqueness of Australia for the investigation of global Cenozoic problems.

An important outcome of the meeting was the formation of a Cenozoic Working Group consisting of Patrick DeDeckker, Peter Davies, Alan Carter, Elizabeth Truswell, Marjorie Apthorpe, Vince Palmieri, Jeff Jenkins, Martin Williams, Bernie Joyce, Bob Galloway and Michael Archer. The composition of the group was thought by some to be a little too dominated by marine geologists, but this was understood in view of the importance for world Cenozoic problems of an understanding of the development of Australian continental margins. A letter to Dr Royce Rutland, Director of the BMR, was drafted by the meeting and expressed strong support for efforts to involve Australia in ODP.

Several papers on the final day of the three days of formal presentations focussed on occupation of the earth by humans, the "sum total of the Cenozoic", as Martin Williams put it. An important point made in this regard was the very strong potential for applied Cenozoic studies. Many of the major contemporary environmental problems must be understood against the background of the Cenozoic. Undoubtedly, similar points were made at the Greenhouse Conference, held in the week prior to the Cenozoic Conference. It is clear that Australian geoscientists have a major contribution to make in this regard. UNESCO has just established a new major regional project, entitled Quaternary Geology for Human Survival, and it is to be hoped that we contribute fully of our understanding of the Quaternary as both resource and hazard.

The Cenozoic Conference was organised by a group from the Monash Department of Geography, comprising Pat DeDeckker, Ian Sluiter, Jim Baxter and Martin Williams, and it was unanimously agreed that this group did an admirable job. The Conference participants spoke, listened and ate at the Warrnambool IAE, and slept at the Country Life Holiday Village, opposite the WIAE. Both facilities are excellent and the smooth running of the Conference and the attractive landscape of the area (despite, for some, the rather surprisingly low temperature!) should encourage more conference convenors in southeast Australia to consider this venue. The total cost for the five days included conference registration, a bound set of abstracts, full accommodation (including three meals per day), conference dinner (including alcohol), field excursion transport and field guide, and all morning and afternoon teas. The **total** cost for all of this was just \$165!! In this era of high-cost conferences (several hundred dollars just to register for some conferences), such value for money is extraordinary and surely reflects the efforts of the organising committee in seeking an

attractive, economical venue. The economic gains to be had when organisation of small conferences is handled by generous people within the discipline are very clear. I know I write for all participants when I express my thanks to the organising committee.

The Conference was extremely valuable because it brought together people working in a wide range of disciplines in the Cenozoic, exposing them to facets of the discipline that they would not normally encounter. It was very efficiently run and all chairpersons did an excellent job in keeping speakers and questioners to strict time limits. The Conference Dinner was most enjoyable and David Branagan, the after-dinner speaker, drew from his wide experience (and musical repertoire) to entertain us. To the music of Gilbert and Sullivan, David led us in proclaiming to all that we are friends of the Pleistocene.

Let's hope that not too much more of the Cenozoic passes before we can again meet to consider this interesting, diversified, and most important area in the geo-sciences. And perhaps we will be able to sing of the Cenozoic, and not just the Pleistocene, for, if anything, the Warrnambool Conference demonstrated that Australia has a unique and valuable perspective on the Cenozoic.

Paul Bishop
Department of Geography
University of Sydney

Courtesy the Australian Geologist
Newsletter No. 66, March 1988.

REPORT ON SYMPOSIUM

LESSONS FOR HUMAN SURVIVAL: NATURE'S RECORD FROM THE QUATERNARY IGC CONGRESS, SYDNEY, 22 AUGUST 1988

This symposium attracted a large and attentive audience and there is obviously world-wide interest in this theme.

Dr. Peter Kershaw (Monash University) discussed the role of palynology in reconstructing former forests and hence throwing light on past climates. The record from northeast Queensland shows an alternation in the Quaternary between rainforest and drier *Auracaria* forest with apparently rapid switching from one to the other. Extinction of some species is now threatened and also occurred in the later Pleistocene associated with increases in charcoal. The climatic implications of vegetation can now be assessed more precisely by analyzing the climatic envelopes of individual species. Detailed pollen records can be used to calculate growth rates of forests. Used properly, this can be a valuable management tool.

Professor Martin Williams (Monash University) pointed out that 'desertification' (admittedly a poorly defined concept) is on the increase everywhere and it is important to know how far this is natural or man-made. Record of sediments and terraces in the Nile Basin, the Son Basin (India) and the Murray-Darling basin indicate similar histories both in the late Quaternary and in historic time. Floods and droughts correlate quite well with high and low ENSO (El Niño-Southern Oscillation) events in all three areas. Deduction of former ENSO cycles from alluvial evidence is, however, unlikely due to the imprecision of the record.

Dr. Hiroshi Machida (Tokyo Metropolitan University) presented maps showing the distribution of major Pleistocene tephra in Japan and Korea. He summarised methods of studying these tephra (e.g. field mapping, mineralogy, dating, isotopes; classification by extent, volume, frequency and explosivity from given centres. There is archaeological and historical evidence for major population declines during big tephra events which are, therefore, a significant natural hazard.

Professor Ian Douglas (Manchester University) considered the effects of Pleistocene events on land use in the tropics. It is now apparent that there were very large changes in river run-off in Amazonia but the situation in southern Asia is not yet well known. Changes in sea level were certainly critical for the latter area with alluvial tin deposits now found on the shelf well below present sea level and also in high Quaternary shore lines. Overuse of groundwater is critical and causing rapid subsidence in e.g. Bangkok - as much as 14 cm per year, complicated by neotectonic effects. The possible 'Greenhouse' rise in sea level would add to the problems. In some areas Quaternary alluvium has concealed a former karst that developed during low sea level phases leading to severe foundation problems.

Roger McLean (Australian Defence Force Academy) discussed the complex likely impact of a 'Greenhouse' rise in sea level on small Pacific islands. Many other factors are involved: plate tectonics, atmospheric and oceanographic setting, antecedent topography, reef type, effects of storms, vegetation, diagenesis of the coral and human impacts. The islands are only a few thousand years old and

sit on Holocene reef platforms. A big storm in the 1970s had a varied effect on different islands which may indicate that the effects of a sea level rise will also be highly varied.

Dr. Peter Roy (Geological Survey of New South Wales) discussed the related theme of sea level rise effects on coral islands. He stressed the effects on population, water quality and pollution.

Dr. Bob Wasson (Division of Water Resources, CSIRO) considered what help in predicting changes can be found from Quaternary studies. Attention needs to be paid to time scales e.g. rate of response to changes in forcing functions, length and resolution of the record. Spatial scales are also important and need to be matched with temporal and human time scales. There is a continuing need for increased quantification if Quaternary studies are to be of assistance. Correct sequences of research are required i.e. starting from the environmental problem and not from the Quaternary record. Some of the issues where Quaternary studies can potentially be of use include the effects of sea level change, 'Greenhouse' warming, ocean flip-flop states, carbon-dioxide changes and the associated effects on vegetation growth.

Dr. John Chappell (Australian National University) stressed the need to concentrate on major issues and differentiate between slow/extensive and rapid/local changes. We have plenty of experience of adapting to rapid local changes (e.g. floods) but little of adapting to rapid extensive changes. Quaternary experience relates to the impact of environmental changes on a low technology, low population world. Major issues where Quaternary studies can help include (1) providing tests for General Circulation Models which seek to predict climate changes, (2) measure slow processes such as pedogenesis and forest dynamics, (3) develop insights into specific problems such as the future for coral islands. While we can alter the environment to suit our needs to some extent, many problems are beyond our powers to fix completely - e.g. erosion of the Chinese loess lands.

Many thanks to Paul Bishop for organising this excellent Symposium.

The Guiding Group confirmed the priority it had given to the coastal zone at its First Session. Considering that one of the most important factors determining marine non-living resources is the variations in sea level due to climatic or tectonic processes, the Group decided to adjust the initial programme SETMY (Sea Level, Environments and Tectonics in the Past Million Years) to a more comprehensive programme on Sedimentary environments, Eustatic sea-level changes, Tectonics and Resources (SETR), within which links between resources and environments are considered without any time limitation. Special attention would be given to the Coastal Zone as a Resource by itself (CZAR) and to the effects of the sea-level changes, either natural or induced by human activities (e.g., subsidence due to the extraction of fresh water and hydrocarbons, and erosion due to the damming of rivers). In the Shelf and Upper Slope (SUS) regimes, the Guiding Group recommended the investigation and mapping of mean-sea-level changes during two key periods: the last glacial retreat (18 000 years before the present) and the last inter-glacial period (125 000 years before present).

From: UNESCO Fourteenth Session of the Assembly,
Paris 1987.

-3- Intergovernmental Oceanographic Commission

RECENT QUATERNARY RESEARCH IN TASMANIA

Compiled by R.W. Galloway

1. An extensive study of the Quaternary deposits of the King Valley in western Tasmania is now approaching completion. It has made extensive use of sections in the sediments exposed by operations of the Hydro-Electric Commission. The results of the study will be published in a Bulletin of the Tasmanian Mines Department. The following have contributed:-

Eric Colhoun (formerly Department of Geography, University of Tasmania, now University of Newcastle): Project co-ordinator.
Sean Fitzsimons (Department of Geography, University of Tasmania): Ph.D. thesis on Quaternary stratigraphy of the King Valley.

Bob Hill (Department of Botany, University of Tasmania): Macro-fossil studies.

Brad Pillans (Department of Geology, Victoria University, Wellington, New Zealand): amino acid dating.

Mike Pollington (Department of Geography, University of Tasmania under the guidance of Charlie Barton and in association with the Bureau of Mineral Resources, Canberra): Masters thesis on palaeomagnetism of lake sediments (in progress).

Guus van de Geer (Department of Geography, University of Tasmania): pollen analysis.

2. Andrew Hammond (University of Tasmania): B.Sc Hons. thesis on soils and glacial geomorphology of the West Coast Range, Tasmania.

3. Greg Holz (Dept of Agriculture, University of Tasmania): M.Sc. on soils and Quaternary stratigraphy of the Coal Valley, eastern Tasmania (in progress; funded by Queensland Department of Primary Industry).

4. David Hannan (Department of Geography, University of Tasmania): M.Sc. thesis on glacial stratigraphy of the Mersey-Forth valleys (in progress).

5. Jenny Whinam (Department of Geography, University of Tasmania): Honours thesis on peat bog development.

6. Richard Cosgrove (Department of Archaeology, Latrobe University): Ph.D. thesis on material from Bone Cave, Bluff Cave and Shannon River. Numerous C14 dates obtained; basal material goes back some 30,000 years; (in progress).

7. Jim Allen (Department of Archaeology, Latrobe university): is directing the "Southern Forests Archaeological Project" which is concerned with the Helsham Inquiry on forest usage in Tasmania.

8. Geoff Hope (Department of Geography, Australian National University): (a) Archaeological/environmental relationships based on pollen analysis of material from Sandown Point on the West Coast. (b) In association with Margaret Alexander (ANU): pollen in cores from Bass Strait going back to approximately 35,000 B.P. (c) In association with Ph.D. student Ian Thomas: pollen analysis of sediments from Camerons Lagoon on the Central Plateau. Ian's thesis is examining vegetation changes in the Holocene to assess relative effects of climate change and aboriginal burning.

9. Wilma Bloom (Department of Geology, University of Sydney): Ph.D. on marine biota in cores from Bass Strait.

10. Eric Colhoun (Department of Geography, University of Newcastle): Has written a Quaternary chapter for a revised version of "The Geology of Tasmania" in press with the Geological Society of Australia. He has also compiled an excursion guide for the recent International Palynological Congress which includes a preliminary account of research on the Darwin Crater sediments. This guide is reviewed elsewhere in this issue of "Q.A." by John Dodson.

11. Mike Barbetti (University of Sydney): Carbon isotope analysis of old buried logs in western Tasmania, in association with Roger Francey and Trevor Bird (CSIRO). The logs are Huon Pine and Celerytop Pine and the oldest material goes back to c. 12,000 B.P.

12. Guus van de Geer (Department of Geography, University of Tasmania): Palynology of deep-sea cores off western Tasmania and western Victoria.

13. Albert Goede (Department of Geography and Environmental Studies, University of Tasmania): (a) Studies of electron spin resonance in closely spaced samples along the axes of U/Th dated stalagmites from Mole Creek in order to detect environmental change. Significant correlations of spectral characteristics with carbon isotope values, uranium content and trace elements have been detected.

(b) In association with Colin Murray-Wallace (McIntosh Centre for Quaternary Dating, University of Sydney): Dating of shells from Quaternary marine deposits using ESR and amino acids in order to confirm rapid uplift rates suggested for parts of the Tasmanian coast.

14. Michael Macphail (Private consultant, Sydney): Pollen analysis of Late Tertiary/Early Pleistocene Linda deposits.

15. Kevin Kiernan (Forestry Commission Hobart and Department of Geography, University of Tasmania): Glaciation of the Southern Forests; glaciation of the upper Franklin Valley; landslips in the Eastern Tiers; glaciation of the upper Forth Valley; evolution of karst hydrology at Mole Creek.

THE CANBERRA QUATERNARY NETWORK
(FORMERLY ANU QUATERNARY NETWORK)

This network was started just over a year ago (see 'Q.A', vol. 6 No. 1) and holds meetings roughly every quarter at which short papers on work in progress or recent conferences are given. Recent meetings included the following:

27 July 1988

John Magee Pleistocene environments in the Simpson Desert
Steve Webb Pleistocene humans in the Simpson Desert
Linda Ayliffe Palaeoclimatic potential of Macropod bones
John Flenley Automation of palynology
 Discussion on proposed graduate program in
 Quaternary Studies

26 October 1988

Allan Chivas Report of SLEADS workshop
Geoff Hope Report of Palynology Conference
Rhys Jones? Report of Quaternary Extinctions meeting
Bob Wasson Report of International Geographical Congress
John Chappell Huon Peninsula Terraces Expedition 1988
Patrick De Deckker Quaternary meeting in London
Allan Chivas ANU Postgraduate School - Quaternary studies
M. Spriggs Pleistocene human occupation of the Solomon
 Islands

For further information and news of forthcoming meetings, contact Patrick De Deckker, Department of Geology, ANU, Canberra.

Leakey visit

The renowned East African palaeoanthropologist, author, film-maker and director of the National Museums of Kenya, Richard Leakey, visited the School in September. Over the last 25 years Mr Leakey has established an international reputation for his work exploring and excavating the habitats of the earliest ancestors of humans. In lectures at the University, he presented a review of humanity's origins in East Africa and evolution since.

Earth Sciences at ANU, November, 1988

Biogeography and Geomorphology survived its Review, undertaken as part of a department by department investigation of the Research School of Pacific Studies but also associated with Professor Walker's retirement at the end of the year. The Department will remain within Pacific Studies with a renewed commitment to work in the School's geographical and intellectual ambit. The professorship to be vacated by Walker will be advertised without preference for any of the Department's disciplinary components. Nigel Wace will also retire at the end of the year but his post will not be re-filled, at least for the present. In the near future, therefore, the Department expects to have three tenured and four non-tenured academic staff but the number of non-tenured posts directly available to the Department will dwindle in future years as they are transferred to a Research School pool.

Biogeography and Geomorphology expects to benefit from allocations from the Research School pool for particular projects, particularly those of a wide disciplinary interest. The relevant committee is currently considering a proposal from **John Chappell** entitled 'Past and future environmental change in lowland river basins, Australia to China' related to a parallel project on global change in the Department of Human Geography. With the planned departure of two of the tenured biogeographers, some work will be wound up and new initiatives in that field begun as Walker and Wace begin their retirements by writing up their long-term research programmes on rainforest dynamics and climatic analysis respectively. Pollen analytical research will continue in the Department with emphasis on fine-resolution studies.

Other activities include the completion of the SLEADS salt lake studies, new departures in the mathematical analysis of vegetation change and the development of AMS radiocarbon dating.

The University will shortly launch its new Graduate School, designed, amongst other things, to facilitate more integrated PhD programmes spanning groups of departments. Biogeography and Geomorphology expects to participate in several such groups, notably Geography, Ecology and Quaternary Studies. A University-wide Quaternary Network has already been set up.

Paul Bishop (Sydney) received further ARGS funding in 1988 for his work on Quaternary environments of north central Thailand, and has recently been appointed the Australian representative of the new UNESCO Major Regional Research Project 218, Quaternary Geosciences and Human Survival in Asia and the Pacific.

UNSW

John Dodson has been awarded SFs 3800 by the International Union of Quaternary Research to assist in organising a conference over the next four years on 'Late Pleistocene Human-Environment Interactions in Australia, New Guinea, New Zealand and the South West Pacific'.

Geoff Humphreys visited Papua New Guinea in June to undertake research on hillslope mantles and colluvial wedges, and on Late Holocene sedimentation in Waigani Lake, near Port Moresby, as part of a research project supported by the Faculty of Applied Science Special Projects scheme.

W. Erskine (NSW) has been engaged as a specialist consultant by Mitchell McCotter and Associates Pty Ltd to undertake a preliminary palaeoflood investigation on the Hawkesbury-Nepean river as part of the preparation of the Warragamba Dam Flood Protection Environmental Impact Statement being prepared for the NSW Water Board.

Patrick Hesp (Macquarie) has been appointed a member of the NSW National Parks and Wildlife Advisory Council. He has received Australian Academy of Science funding to visit China in mid-1988 to conduct research on longitudinal dunes in northwest Inner Mongolia.

Eric Colhoun has received \$3000 from the University of Newcastle for a study of the Stability of the Continental Ice Edge, Vestfold Hills, Antarctica, and \$7500 from the Hydro-Electric Commission, Tasmania, for work on glaciation in the King Valley.

ABORIGINAL AUSTRALIA

australian
museum
6-8 COLLEGE ST • SYDNEY 2000 • TEL (02) 339 8111

The exhibition is about aspects of Australian Aborigines, both past and present. In the beginning the Dreaming explains the creation and continuity of life. A reconstructed archaeological dig gives evidence through time of the people in a changing environment. We see life before and after contact with Europeans. We also see how some Aborigines are living today and finding different solutions to contemporary life.

Dreaming

Long ago in the Dream-time, spirit ancestors wandered the earth. They performed great deeds, created all living creatures and shaped the earth to the landscape we know today. These spirits and their actions survive through song, dance, painting and story telling in a philosophy known as the Dreaming. The Rainbow Serpent, The Morning Star and Wandjina Dreamings are examples of this art. The Dreaming of the Warlpiri and the Wandjina rock painting, illustrate the survival of the Dreaming through to the present.

The Aboriginal Past

Aboriginal people recount their history through stories of the Dreaming. Archaeologists, trained in the western scientific methods, interpret Aboriginal history by studying such material as stone tools, food remains and campsites. The differences in approach do not mean one is right and one is wrong.

Scientists believe that Aboriginal people came from southeast Asia at least 40,000 years ago during the last Ice Age. The Burrill Lake site shows changes which occurred during continuous occupation there over the last 20,000 years.

Colonisation

With the arrival of Europeans, the interests of the penal colony and early settlers clashed with those of the traditional inhabitants. The forced takeover of land was accompanied by the introduction of new diseases together with widespread ignorance of and disregard for, the fragile balance of forces which maintained Aborigines in their traditional life. Government control of Aborigines contributed to further breakdown of the fabric of life well into the present time.

Traditional Life

At the time of contact with Europeans, Aborigines followed many different ways of life, each adapted to the local environment.

The NSW coast, the inland rivers and the northern QLD rainforests were three areas showing successful occupation before European contact. Life was a complex interaction between people, the land and the seasons, as is shown by tools, utensils, food, trade, art and many other aspects.

The Present

Throughout Australia, Aboriginal people are experiencing a variety of lifestyles, from outstations in the bush to urban life in the big cities. Aborigines are establishing many of their community initiatives designed to meet the particular needs of their area and group.

The progress of many groups in rediscovering and securing ways of life which reflect their hopes and needs is often frustrated by the actions of government and the attitudes and actions of individual fellow Australians. Much has been achieved in the last decade or so to maintain the dignity of the first Australians, but much remains to be done.

QUATERNARY JOTTINGS - MUSEUM OF VICTORIA

Public Environmental Education Programme, involving Quaternary landscape evolution, are part of a new initiatives programme in the Museum of Victoria. Museum scientists with their vast collections can no longer afford to remain closeted in their laboratories. The response of museums to expanding areas of public communication constitute a new challenge calling for creative and innovative programmes.

The Victorian Environmental Education Programme, reviewing the current state of scientific knowledge, will address a specific region of that state year by year, eventually providing coverage of the whole state. The first programme, conducted in September and October was directed to the Victorian Mallee. Entitled "Understanding the Mallee: Towards a Scientific Basis for Environmental Management", the programme commenced with a full day of lectures at Mildura TAFE. Addressed by scientists of the Museum and the Department of Conservation, Forests and Lands, the theme focussed on the scientific understanding of public lands, especially national parks.

Lectures were followed by two full day excursions - one to the Willandra Lakes and the other to Hattah-Kulkyne National Park on the Victorian side of the river. In crossing the Murray River, with its south bank forming the legislative, conceptual and social barriers, these field trips saw uniformed members of Victoria's CFL visiting Lake Mungo for the first time and vice versa at Hattah on the following day. The total response was most enthusiastic. To have botanists, zoologists and prehistorians in the field with land managers, was in many ways a new experience to us all. The teachers from the Museum are organising a follow-up programme in 1989 in the same region.

The field programme was supplemented by a day of lectures in the city aimed at the urban audience. Opened by the new Minister for Conservation, Forests and Lands, Ms Kaye Setches in the State Film Centre, the meeting covered aspects of geomorphology (Jim Bowler and Phil Macumber), Prehistory (Carol Bird and David Clarke), Fauna (Alan Yen and Andrew Bennett). A panel, chaired by Mr Doug Pearson, New South Wales Commissioner of Western Lands, led the final discussion. In the context of the recent survey of the Land Conservation Council's recommending the addition of 600,000 hectares of the Sunset Desert to National Parks, the scientific discussions led into many areas of political and social relevance.

The Museum's 1989 Environmental Education Programme is oriented towards Victoria's coastal environments focussing on the scientific framework which forms the basis of the somewhat controversial marine reserves in eastern Victoria (Bunurong, Corner and Shallow Inlets and Wilsons Promontory).

With the Victorian Government's granting of a new \$140,000,000 building on the Southbank of the Yarra, life is anything but dull at the old museum.

On a more personal note Bowler has been granted funding with Professor Tom McMahon, Department of Agricultural Engineering at Melbourne University by ARC to advance hydrologic study of close lakes. This involves the development in Professor McMahon's department of computer modelling analyses of the the western Victorian's lakes - Lake Frome, Lake Eyre and Qinghai Lake in western China.

At its recent general meeting, the Australian Academy of Humanities elected Bowler and 5 others as new Fellows to the Academy.

Darwin's theory confirmed — this island group is sinking

A theory floated by naturalist Charles Darwin 150 years ago about the formation of the Cocos Keeling Islands has finally been confirmed by a team of Australian geomorphologists. The group of islands makes up Australia's only mid-oceanic coral atoll and the geomorphologists believe that the data they obtained during their recent visit to the atoll will provide the basis for assessing the impact of the so-called greenhouse effect on our corner of the globe.

The team of three included Dr Colin Woodroffe, from the University's North Australian Research Unit (NARU), now with the University of Wollongong, Professor Roger McLean, a reef specialist with the Australian Defence Force Academy (ADFA) and Mr Eugene Wallensky, technical officer, Research School of Pacific Studies. Their trip to Cocos Keeling was funded by a \$US8,000 grant from The National Geographic Society to mark the 150th anniversary of Charles Darwin's epic circumnavigation in *The Beagle*. According to Mr Wallensky, the grant, together with support from ANU and ADFA, enabled the team to transport a drilling rig to the islands to test Darwin's notion that the atoll is in fact sinking.

Isolated

Located in the Indian Ocean 2,500 kilometres east of Darwin, the atoll is arguably the most isolated on earth. 'While in South America during his voyage around the world, Darwin postulated a theory regarding coral atoll evolution. After visiting Australia looking for evidence to support his idea, he sailed on to Cocos Keeling to test it. He believed that the ever-increasing weight of the coral growing around the edge of the volcano in the centre of the atoll was slowly forcing it to sink into the sea. He went on to conclude that the coral remaining above sea level formed the platform for the 27

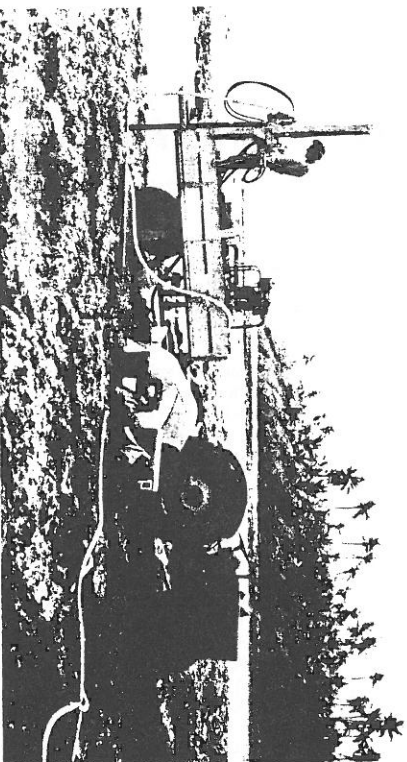
islands which make up the atoll,' explained Mr Wallensky.

'It was tremendous for us to follow the footsteps of the great man and gather our own data. Although many naturalists have visited the islands since Darwin, we were the first scientific team to take extensive drill samples and thoroughly test his theory.'

Drill sampling revealed a Pleistocene reef, probably 100,000 years old, between nine and 20 metres below present sea level. As this ancient coral must once have existed at sea level, the samples confirmed that the volcano is sinking. Furthermore, the University's radio carbon dating laboratory has been able to show that the Holocene platform directly beneath the islands is only a few thousand years old. 'Of course, the process of sinking is extremely slow and would have no effect on the inhabitants of the islands,' Mr Wallensky said.

Of far more immediate importance to the seven hundred islanders is any rise in sea level due to the greenhouse effect. According to Mr Wallensky, the islands are very low, many of them only a few metres above sea level. 'So far there has been no noticeable change in water level. However, a rise of half a metre or more, as has been predicted by some scientists, would see some atoll islands simply disappear from the face of the earth.'

'We went to the islands to test Darwin's



Mr Wallensky operating a drilling rig at Cocos Keeling Islands. His team confirmed a theory proposed by Charles Darwin 150 years ago.

theory and to get a geomorphological history. We wanted to know how they formed and how they have changed. The data we gathered indicated that the Cocos Keeling Islands would be an excellent Indian Ocean site for Australian scientists to monitor any impact of the greenhouse effect. This information will be extremely important for other inhabited coral atolls in the Indian and Pacific Oceans.'

Over the next few years, the team hopes to return annually to the islands to carry out further geomorphological testing and to look at the dynamics of the water movement around the atoll and the consequent sedimentary changes. 'Darwin and more recent

naturalists have given us a 150-year history of atoll change upon which to add our own observations. Such a length of environmental recording is rarely available to reef scientists and gives us a wonderful picture of the island's evolution,' said Mr Wallensky.

Bone discovery may pose challenge to theories on Aboriginal migration

An archaeological expedition including members from ANU has found a piece of skull believed to be up to 60,000 years old, which would make it the oldest evidence of human life yet found in Australia.

The heavily fossilised piece of bone was discovered during an expedition to Lake Eyre earlier this year, part of a cultural history project organised by the South Australian Museum. If the bone is as old as preliminary tests indicate, its presence in the Lake Eyre Basin lays open to question the existing theories about human migration to, and within, Australia.

The piece of bone was found by Dr Ron Lampert, a former research fellow in the Research School of Pacific Studies (RSPaCS) and was recognised as human by Dr Steve Webb, a physical anthropologist and visiting fellow in the Department of Prehistory, RSPaCS. While the major part of the museum project was to examine the area's cultural history over the last 200 years, Dr Webb and Mr John Magee, a geologist in the School's Department of Biogeography and Geomorphology, received a small portion of the funds to look for evidence of early human habitation.

'The general orthodoxy about the arrival of the first people to this continent was that they came from the north, followed the marine routes around and down the eastern coast and then, over a period of many thousands of years, dispersed, finally arriving in the interior quite late in history. Much

of the reason behind this idea was that these early people would have steered clear of the harsh central desert regions for as long as possible,' he said.

'However, I tend to support a theory first put forward nearly 30 years ago by Professor John Mulvaney [visiting fellow, Research School of Social Sciences] but which has been dismissed by most other prehistorians. He proposed that the first migrants may have spread directly southwards, following the river routes. If you go back beyond, say, 40,000 years, we now know that permanent river systems fed into Lake Eyre and flowed through savannah vegetation which would have been an excellent environment to support both animal and human life.'

Palaeontologists have found rich deposits of bones and fossils of extinct fauna throughout the basin, particularly in the sedimentary layers of the flood plains of Cooper Creek and the Warburton River. In the layers have been found the bones of many species of large extinct animals, including nine-metre pythons, seven-metre goannas and marsupial lions. Such large predatory creatures can flourish only when animal and plant life is abundant.

However, while palaeontologists and explorers had ventured into the remote and often inaccessible region late last century, no survey of early human occupation had been carried out by archaeologists. Dr Webb and Mr Magee were the first people to search specifically for such evidence.

'We were particularly looking for evidence of humans from the late Pleistocene period,



Dr Steve Webb (centre) with Dr Patrick De Deckker (left) and Mr John Magee. Dr De Deckker, a lecturer in Geology, Faculty of Science, has examined microfossils found in soil sediments brought back from the Lake Eyre Basin site. The three are examining a piece of bone from the extinct giant marsupial, the short-faced kangaroo. It was one of several pieces of megafaunal bone found at the site. Photo by Bob Dowhy.

that is, from between 10,000 and 100,000 years ago,' explained Dr Webb. 'For a long time I had had the idea that the first migrants to Australia were not *Homo sapiens*, that is, modern man, but descendants of the more archaic Java hominids.'

The piece of human skull was discovered only two days into the expedition. 'At first, we could hardly believe what we had in our hands,' Dr Webb said. 'It seemed impossible that we had found evidence of what we were looking for so early in our search.' According to Dr Webb, it did not resemble the robust appearance of human skulls found in other parts of the continent, nor was it indicative of 'gracile' remains found in the Willandra Lakes region of western NSW, where the famous Mungo Man was discovered more than 15 years ago.

Dating

Dating the piece of bone has been difficult. Carbon dating was impossible because the organic material necessary to perform the test had been leached out in the fossilising process. Therefore, the comparative bone dating process of fluorine analysis was used. Mr Jim Calwell, a geochemist in the Department of Biogeography and Geomorphology, RSPaCS, analysed samples of the human and megafaunal bones.

'There are two points of significance about these findings,' said Dr Webb. 'Firstly, the older piece of skull lies within the age range of the megafauna samples, which would suggest that both groups existed alongside each other. Archaeologically, evidence of such coexistence is rare. Secondly, the megafauna is thought to have died out at around 35,000 to 38,000 years ago, which dates the human before this time.' The skull's fluorine content is nearly twice as high as the 28,000 to 30,000-year-old remains found at Lake Mungo, the oldest human remains found to date in Australia.

'Although the fluorine content of bone can only provide a relative date, the degree of mineralisation and the level of nitrogen detected strongly suggests the presence of humans in the Lake Eyre Basin 40,000 years ago and probably much earlier,' he said. 'If indeed it is older than Mungo Man, then the bone is the most ancient ever found in Australia. This means that the first people arriving in this country did so a lot earlier than previously thought and probably did follow river routes to the centre of the continent rather than around its eastern fringe.'

The team's findings have excited academics from around the country who are beginning to recognise the enormous potential of the Lake Eyre Basin. Several have indicated their desire to take part should a core project be established. They include specialists in satellite imagery, dating techniques, micro-palaeontology, geomorphology, palynology (pollen studies) and, of course, archaeology and vertebrate palaeontology.

'We want to form a complete picture of the environment of the basin over the last 100,000 years,' Dr Webb said. 'We need to understand the biology of the megafauna and its extinction. We would like to learn more about the living conditions and alterations in the environment and put together a picture about the first humans in this country. This would add substantially to our knowledge of the expansion of humans around the world. Were they descendants of Java man and *Homo erectus*, or were they, like today's *Homo sapiens*, descendants of the second wave of humanity which is thought to have originated 200,000 years ago in Africa?'

Dr Webb and Mr Magee estimate they need \$350,000 to get a five-year project off the ground. They have applied to several sources for funding, including the private sector, but so far, they have heard nothing.

Blood from stone

Who says you can't get blood from stone? Mr Tom Loy has proved that it's possible. As a visiting fellow in the Department of Prehistory, RSPaCS, he viewed the skull and kneebone samples found at the Lake Eyre Basin with more than curious interest.

Mr Loy is one of a handful of archaeologists around the world who have entered the highly specialised scientific world of residue analysis. This means studying microscopic particles such as hair, starch grains, feathers and blood which are left behind on stone tools and bones. Mr Loy made the discovery of prehistory residues while working as a museum curator in Canada and is specifically interested in developing new analysing techniques.

The bones brought back from the Lake Eyre Basin are now fossils. They feel heavy in the hand and the original bone tissue has changed over thousands of years into stone. Regular carbon dating has not been possible because any obvious organic matter disappeared long ago in the fossilisation process.

Despite this, after crushing a small fragment of fossil, Mr Loy was able to extract blood — in particular, haemoglobin molecules. He will be sending these samples to laboratories in Canada or New Zealand which are technologically capable of carbon-dating such minute traces. It will be at least February before the results of these tests are known.

So, what is it about blood that allows it to survive for so many thousands of years? Its unique structure, says Mr Loy. 'In life, blood proteins are desigable to be soluble. When it dries out, the globular shaped protein

molecules don't self-destruct, but unfold a little and expose their hydrophobic, or moisture-resistance areas, to the outside world. This makes the molecules virtually insoluble, and if they are stabilised by soil, the blood can survive for many thousands of years.' Bone is a particularly favourable environment for the preservation of relatively large amounts of blood, because it has a hard protective outer layer and an internal cellular structure with a large surface area.

White cells have been identified in extracts of other ancient bones under study by Mr Loy. Such cells could reveal startling details about the animal or human being which produced them. 'Using gene amplification techniques, it is possible to make copies of fragments of DNA from the white cells and compare the gene sequences with modern humans and all the ages in between,' he said.

'It may be possible to compare the genetic differences between *Homo sapiens* and say, *Homo erectus*. Certainly there are gross skeletal differences, but at this stage we simply don't know the extent of similarity at the genetic level.'

Mr Loy will visit colleagues in North America in December to work out what are the best techniques for the extraction of prehistoric DNA.

The implications of Mr Loy's work for Australian archaeology are particularly exciting. Through his work, it may be possible to link humans with the demise of the megafauna. Although it is widely believed that hunting contributed to their extinction, such proof has never been found. If Mr Loy can find megafauna blood on stone tools, he may have answered that question.



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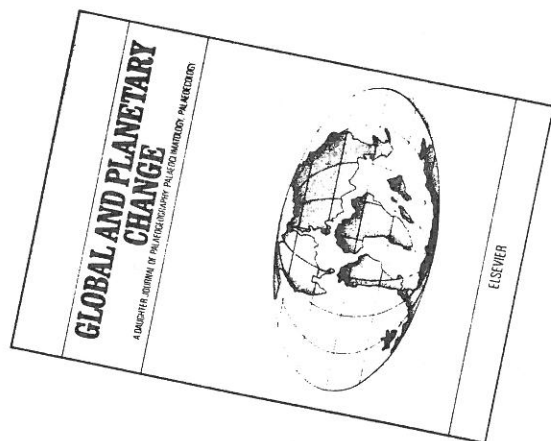
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Earth System Science Center
512 Deike Building
Penn State University
University Park, PA 16802
U.S.A. | Sierd Cloetingh
Department of Geophysics
Vening Meinesz Institute of Earth Sciences
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BOOK REVIEW: CAINOZOIC VEGETATION OF TASMANIA

by E.A. Colhoun (compiler) and with contributions by eight others. Published as a special paper by Department of Geography, University of Newcastle and available there and from the Macintosh Centre for Quaternary Dating, University of Sydney. Cost \$12.00 plus \$5.00 postage.

Tasmania has an inordinate number of unique environments in the richness that is Australia. It is home to many endemics and it is important to know the environmental history of this sometimes island to understand their distribution. In addition, Tasmania, because of its geographical position, has a role of National and International importance in providing evidence of environmental change. This book is an up-to-date account of such change from the Tertiary and Quaternary periods.

While originally written as a field guide for the 7th International Palynological Congress (Brisbane, 1988) its appeal is much wider. Indeed the 151 pages contain a wealth of maps and figures describing stratigraphic detail rarely possible in the usual publication outlets. The seven chapters begin with an environmental synopsis of the island: describing geology, soils, climate, vegetation and a new chrono-stratigraphic framework for the western region. The rest describe the Mount Field area, Darwin Crater and the King and Linda Valleys, the Gordon River and Macquarie Harbour, the West Coast Ranges, the Forth and Mersey Valleys, and the Tamar Basin and Central Plateau. Most of the text is written by the original researchers.

The main value of the book is the wealth of new data and syntheses, not least being the long-awaited Darwin Crater record (even if it is only the top 20m of record). There are many new pollen diagrams and stratigraphic sections and macrofossil data from earliest Tertiary time.

The main drawback of the book is that some of the maps are not quite good enough to retrace the tour without extra guidance. The geology and vegetation maps are poorly reproduced (Figs. 2 and 7) and there is also some text missing on page 6. These criticisms are minor given the measly cost of the publication.

I advise all Cainozoic types to order their copy before the print run is exhausted.

JOHN DODSON

Pollen Morphology and Plant Taxonomy

Angiosperms

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by

G. ERDTMAN

1986. (xii, 553 p., 262 fig.)

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The word 'palynology' was coined in the 1940's to embrace studies of pollen grains and spores and their dispersal. Since then interest in palynology and its applications has grown immensely all over the world. *Pollen Morphology and Plant Taxonomy* has remained the classic and basic textbook for scientists interested in pollen morphology and its significance in angiosperm taxonomy. Beginners as well as more advanced palynologists always consult the accurate drawings, descriptions and ideas expressed by the late Professor G. Erdtman. The last edition was printed in 1966. With reference to a steadily increasing demand from a new cadre of palynologists, botanists etc. the appearance and availability of this new edition will fill a 20 year-old gap.

Sea-Level Research: a Manual for the Collection and Evaluation of Data

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TREE RINGS

Basics and Applications of Dendrochronology

by

FRITZ HANS SCHWEINGRUBER

Swiss Federal Institute of Forestry Research, Birmensdorf, and
Institute of Botany, University of Basel, Switzerland

1988. 292 pp.

Hardbound Dfl. 295.00/£84.00

D. Reidel Publishing Company

ISBN 90-277-2445-8

This book offers both expert and layman alike the key to understanding annual rings. Written in an easily understandable form and attractively illustrated, it explains, for example, how it was possible to fix with certainty the dates of the different phases of construction through which the Cathedral of Trier has passed. A Stradivari violin's 'guaranteed genuine' could be proved to be a fake, the number of sunspots could be shown to have varied for centuries, the current situation where trees in forests and in towns are dying is not new; proof is available that the damage started tens of years ago, and so on. Interesting examples from archaeology, history, geomorphology, ecology, and isotope physics have been selected which illustrate the great variety of areas of application where annual ring analysis (dendrochronology) can be used.

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1988, 175 pp. Soft cover
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The book deals with natural climate variations during the last 600,000 years. Topics include astronomic influences on palaeoclimates, climate and environment, natural CO₂ variations based on investigations of ice curves and climatic information from wood density. The long and short-term variability is the basis for modelling and prediction of anthropogenically induced climatic changes.

Volume 5

T. Liu, Beijing, People's Republic of
China

Loess in China

2nd ed. 1988. 80 figures, 51 tables.
Approx. 250 pages. Hard cover DM
178,- ISBN 16717-X
(Originally published and distributed by
China Ocean Press 1985)

Contents: A Brief History of Loess
Studies in China. - Regional Distribu-
tion of the Eolian Products (Loess). -
Time Sequence of Loess Deposits. -
Fossils in Loess and Its Ecological Envi-
ronment. - Composition of Loess. -
Loess and the Environment. - Methods
in Loess Research.

The distribution, deposition, composi-
tion and texture of loess in China is
studied. Based on on-the-spot investiga-
tions, **Loess and the Environment**
supplies information on: the loess-paleo-
sol time sequence, loess fabric, and geo-
logical events derived from studying bio-
logical relics.

Proceeding from the loess environmen-
tal system, the climatic fluctuation
sequence of different scales has been
reconstructed, and the whole process of
eolian loess accumulation and its rela-
tionship with modern silt dust, water
and soil conservation, engineering geol-
ogy, agricultural soil as well as local
diseases are discussed.

LANDFORMS AND SOILS OF THE SOUTH COAST AND HINTERLAND, WESTERN AUSTRALIA

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Ages and Origins

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BRYAN A. BARLOW

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1986. (viii, 543 p., numerous figs. and tables)
ISBN 90 04 08171 2

PART A. THE ALPINE ENVIRONMENT: LANDFORM, CLIMATE, ECOLOGY,
ADAPTATION

- C. D. Ollier, The origin of alpine landforms in Australasia
R. B. Galloway, Australian snowfields past and present
A. B. Costin, Genesis of Australian alpine soils
P. Wardle, Alpine vegetation of New Zealand: an ecological review
N. Gibson & G. S. Hope, On the origin and evolution of Australasian alpine cushion plants
I. C. Campbell, M. E. McKelvey & P. S. Lake, The fauna of Australian high mountain streams: ecology, zoogeography and evolution

PART B. VEGETATION HISTORY: RECORDS FROM THE PAST, INTERPRETATION
FROM THE PRESENT

- J. M. B. Smith, Origins of Australasian tropicalalpine and alpine floras
G. S. Hope, Development of present day biotic distributions in the New Guinea mountains
A. P. Kershaw, J. R. McEwen Mason, G. M. McKenzie, K. M. Strickland & B. E. Warstaff, Aspects of the development of cold-adapted flora and vegetation in the Cenozoic of southeastern mainland Australia
A. R. H. Martin, Late Glacial and early Holocene vegetation of the alpine zone, Kosciuszko National Park
M. K. Macphail, "Over the top": pollen-based reconstructions of past alpine floras and vegetation in Tasmania p.t.o.

The Past Three Million Years. Evolution of Climatic Variability in the North Atlantic Region. N. J. SHACKLETON, R. G. WEST, and D. Q. BOWEN, Eds. The Royal Society, London, 1988. viii, 278 pp., illus. £53. First published as *Philosophical Transactions of the Royal Society*, vol. 318 (1988). From a meeting, London, Feb. 1987.

The Chemistry of Prehistoric Human Bone

Edited by T. DOUGLAS PRICE
Professor of Anthropology, University of Wisconsin, Madison

**Monsoonal Australia – Landscape, ecology and
man in the northern lowlands**

edited by

C.D.HAYNES

Department of Conservation & Land Management, Perth

M.G.RIDPATH

CSIRO Tropical Ecosystems Research Centre, Darwin

M.A.J.WILLIAMS

Department of Geography, Monash University, Melbourne

1988, 20 x 28 cm, c.260 pp., 35 b/w photos, 31 color plates
Hardcover, Hfl.105 / \$55.00 / £31 90 6191 638 0
Publication date: December 1988

This book describes a little-known tropical environment – the unique lowlands of Northern Australia where a monsoonal climate dominates every aspect of life. The monsoon is the unifying theme linking landscape, ecology and man. The book draws substantially on recent research, much still in progress, including that of the 19 authors.

This is the first serious attempt ever made to provide an ecological perspective of the coastal lowlands of monsoonal Australia. In particular it emphasizes the features which distinguish monsoonal lowlands and their biota from those of temperate regions. It explores afresh some of the processes which govern tropical ecosystems. This synthesis also throws new light on important issues affecting management, such as the impact of feral animals, the use of fire and the needs of conservation. The importance of this is highlighted by the now rapid development of uranium mining and tourism within the region. Where they believe it warranted authors express views on management and the future which are fresh and, in some cases, will be found provocative.

The 13 chapters cover the history of the landscape, the climate, the vegetation, the vertebrate animals, Aboriginal association with the land, conservation and the future. It will be of value to all ecologists and others interested in the Tropics, the growing body of visitors to tropical regions of the Northern Territory (e.g. to the magnificent Kakadu National Park), those taking courses in biology at universities and elsewhere, and teachers – particularly in Northern Australia. It should inform and assist the understanding of all those concerned about the management and future of a resource possessed by no other developed country: and one of the last areas where Aboriginal life and land management retains a large measure of its integrity.



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Vegetation History

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Dr Brian Huntley, Dept. of Botany, University of Durham,
 Science Laboratories, UK and **Dr Thompson Webb III**,
 Dept. of Geological Sciences, Brown University, Provi-
 dence, RI, USA

HANDBOOK OF VEGETATION SCIENCE 7

This volume brings together contributions from experts in various aspects of palaeoecology in an effort to present to vegetation scientists, biogeographers, and others for whom palaeoecology is not a specialization, the methods, limitations, and achievements of palaeoecology in unravelling the history of world vegetation since the late-Tertiary Period. Methods and the types of data used are discussed first – an essential background to the presentation in the bulk of the book of the results of palaeoecological research. The results are presented in relation to three timescales: 10^7 – 10^4 years – the timescale of major environmental fluctuations and changes; 10^4 – 10^3 years – the timescale for the development of vegetation after the warming of the last glacial cycle; and 10^3 – 10^2 years – the timescale in which man has had an impact upon vegetation, and at which many dynamic vegetation processes occur.

The first two timescales are covered by series of chapters dealing with discrete geographical areas while, at the shortest timescale, chapters deal with the methodological approaches possible and with what they can offer to vegetation science. An Introduction and closing Discussion by the editors provide the context and a summary of the content of the many contributed chapters.

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Contents and Contributors

Introduction (Brian Huntley and Thompson Webb III).
Section I: Background and Methods I.1 Ancient permanent plots: Sampling in paleovegetational studies (G. L. Jacobson Jr.) I.2. Records of vegetation in time and space: the principles of pollen analysis I. Colin Prentice). I.3 Data analysis and display (E. C. Grimm). I.4 Time Scales and dating (M. Saarnisto). I.5 Late-Tertiary and Quarternary palaeoenvironments (P. J. Bartlein). **Section II: Late-Tertiary and Pleistocene Vegetation History – 20 My to 20 ky.** II.1 Europe (W. A. Watts). II.2 North America (L. E. Heusser, J. E. King). II.3 Australasia (A. P. Kershaw). II.4 South America (T. van der Hammen). **Section III: Glacial and Holocene Vegetation History – 20 ky to present.** III.1 Europe (B. Huntley). III.2 Eastern North America (T. Webb III). III.3 Western North America (R. S. Thompson). III.4 Japan (M. Tsukada). III.5 The Arctic (H. F. Lamb, M. E. Edwards). III.6 New Zealand (M. S. McGlone). **Section IV: Smaller-Scale Studies.** IV.1 Fire and disease history forests (W. A. Patterson III, A. E. Backman). IV.2 The rôle of man in European vegetation history (K. E. Behre). IV.3 Human disturbance of North American forests and grasslands: the fossil pollen record (J. H. McAndrews). IV.4 Post-glacial vegetation history: Ecological considerations (K. D. Bennett). IV.5 Spatially-precise studies of forest dynamics (R. H. W. Bradshaw). IV.6 Temporally-precise studies of vegetation history (J. Turner, S. M. Peglar). **Discussion** (B. Huntley, T. Webb III). **Index.**

1988, 816 pp.
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Reports on the Northeastern Part of the Qinghai-Xizang (Tibet) Plateau

by a Sino-W. German Scientific Expedition

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Ostracoda in the Earth Sciences

edited by **P. De Deckker**, Department of Geology, The Australian National University, Canberra, A.C.T., Australia, **J.P. Colin**, Esso Research, Bègles, France and **J.P. Peyrouet**, Département de Géologie et Oceanographie, Université de Bordeaux I, Talence, France

1988 302 pages
Price: US\$ 84.25 / Dfl. 160.00
ISBN 0-444-43011-3

APPROXIMATE MONTH OF PUBLICATION: JULY

Ostracods belong to a group of microfossils found in nearly all types of aquatic environments. These microcrustaceans, characterized by a bivalved, calcitic carapace, are used to reconstruct ancient environments. For example, they can help to provide information on palaeoclimates, palaeogeography, the formation of deep oceans, sea level changes, etc. This book endeavours to bring about a greater understanding of their usefulness in many aspects of geological sciences, and provides suggestions for future research. It is principally intended for the non-specialist, and shows many applications of ostracods to help solve geological problems and phenomena. Topics reviewed assume no prior knowledge of palaeontology, and thus terminology is kept simple. There is an exhaustive index, and an appendix supplying additional references on significant sources of information on ostracods.



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The Geomorphological and Zonational Development of Mangrove Swamps in the Townsville Area, North Queensland A.P. Spencely \$3.30

Sand Spit and Bar Development Along the East Burdekin Delta Coast, Queensland, Australia A.D. Pringle \$5.00

PUBLICATIONS FROM NORTH AUSTRALIA RESEARCH UNIT, DARWIN

Coasts and Tidal Wetlands of the Australian Monsoon Region K. N. Bardsley, J.D.S. Davie and C.D. Woodroffe (eds). 1985, 375pp; \$22.00.

Coastal Management in Northern Australia J.D.S. Davie, J.R. Hanley and B.C. Russell (eds). NT Branch of the Marine Sciences Association and NARU. 1985, 89pp; \$8.00.

Geomorphological Dynamics and Evolution of the South Alligator Tidal River and Plains, Northern Territory C.D. Woodroffe, J.M.A. Chappell, B.G. Thom and E. Wallensky. 1986, 190pp+ 2 maps; \$12.00.

SEA SURFACE STUDIES — A GLOBAL VIEW

Edited by R.J.N. Devoy, Croom Helm Ltd 1987, 649pp. \$192.

Beneath its somewhat misleading title, this book contains a good selection of review papers on sea levels and sea level change. The 15 authors and 19 chapters cover topics such as: Ocean volume changes, Glaciation and sea level, Tectonic processes and sea level, Global correlation, Pre-Quaternary, Quaternary and Holocene sea level changes, and contemporary issues such as the Greenhouse Effect and man's response to sea level change.

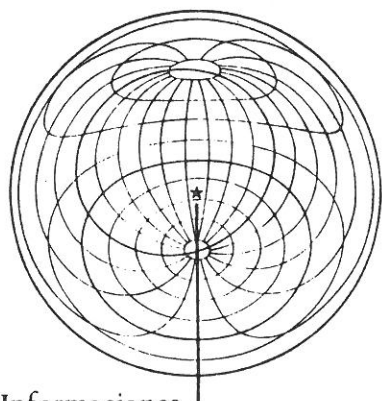
Of particular interest to Australians are chapters on Southern Hemisphere Quaternary (B. Pillans) and Holocene (D. Hopley) sea level changes. However, I found the most useful contributions to be those by Peltier on the global response of an elastic earth to ice and water loading, and by Shennan on global correlation of sea level data. The collective chapters, and these two papers in particular, emphasise the breadth of spatial and temporal scales over which sea level change has operated and the complexity of unravelling the causative factors. If anything, reading this book has reinforced my scepticism of simplistic statements such as "global sea level has risen over the past century" which are appearing with increasing frequency in the press. Proponents of the Greenhouse Effect, such as the chapter by Titus, continue to use "globally-averaged" tide gauge data as prima-facie evidence of a global sea level rise. The book's contents also serve to reinforce the importance to contemporary sea level studies, of an adequate understanding of fundamental controlling factors such as hydro-, glacio-, geoidal- and tecton-eustasy.

This hardbound book is technically well produced, with contributions arranged into six major parts. The cost is somewhat high, particularly considering most contributions were written in 1984/1985. It should be read by researchers working on sea level change, and by engineers, planners, environmentalists and non-specialists concerned about this important aspect of our changing environment.

Tony Belperio,
Geological Survey of South Australia.

Courtesy: Australian Geologist Newsletter
No. 68, Sept. 1988.

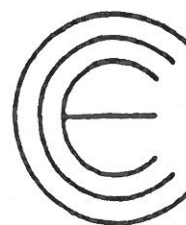
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EDITED
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J.F. ARAYA-VERGARA

SANTIAGO DE CHILE
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PALEOLIMNOLOGY

Aspects of Freshwater Paleoecology and Biogeography

edited by **J. Gray**, Department of Biology,
University of Oregon, Eugene, OR, USA

Repr. from *Palaeogeography*,
Palaeoclimatology, *Palaeoecology*, Vol. 62, No.
1-4

1988 about 634 pages
US\$ 168.50 / Dfl. 320.00
ISBN 0-444-42939-5

Paleolimnology, particularly of the pre-late Quaternary, provides one of the most demanding challenges to paleoecologists - one that it is to be hoped will be answered by improved techniques and newer technical equipment, especially the electron microscope, which has made feasible the study of many groups in ways not previously possible. The papers in this volume primarily address the many kinds of organisms that have left remains in inland waters. They review the state of paleoenvironmental interpretation with particular organisms, discuss limitations and potential, and

what types of specific environmental information can be obtained that is useful to the paleoecologist.

Paleolimnology is essentially a geological discipline and this book will therefore be of interest to its practitioners, namely paleobiologists, paleoecologists, sedimentologists, and geochemists.

Contents: Introduction (*J. Gray*). Evolution of the freshwater ecosystem: the fossil record (*J. Gray*). Lacustrine varve formation through time (*R. Y. Anderson, W.E. Dean*). Biological and sedimentary facies of Australian salt lakes (*P. De Deckker*). Freshwater fungi: fossil record and paleoecological potential (*M.A. Sherwood-Pike*).



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Chrysophycean microfossils in paleolimnological studies (*J.P. Smol*). Fossil diatoms and Neogene paleolimnology (*J. Platt Bradbury*). Freshwater macrophytes in palaeolimnology (*M.E. Collinson*). Fossil pigments in paleoecology and paleolimnology (*J.E. Sanger*). Lacustrine thecamoebians (mainly arcellaceans) as potential tools for palaeolimnological interpretations (*F.S. Medoli, D.B. Scott*). Utilization of freshwater sponges in paleolimnological studies (*F.W. Harrison*). Conchostraca (*P.W. Frank*). Guidelines and limitations to cladoceran paleoecological interpretations (*M.C. Whiteside, M.R. Swindoll*). Paleoecology of limnic ostracodes: a review of some major topics (*P. Carbonel et al.*). An account of the techniques using ostracodes in palaeolimnology in Australia (*P. De Deckker*). The historical ecology of aquatic insects: an overview (*R.J. Wootton*). The use of caddisflies (Trichoptera) in palaeoecology (*N.E. Williams*). The significance of chironomid analysis (Insecta: Diptera) for paleolimnological research (*W. Hofmann*). Aspects of freshwater mollusc ecological biogeography (*D.W. Taylor*). Fish taphonomy and environmental inference in paleolimnology (*R.L. Elder, G.R. Smith*). Paleoecology and sedimentology of a Late Triassic lake, Culpeper Basin, Virginia, USA (*P.J.W. Gore*). Reconstruction of ancient lake environments using both autochthonous and allochthonous fossils (*M.V.H. Wilson*). Index.

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主任: 陳坤耀

27 September 1988

To: All Subscribers to the East Asian Tertiary/Quaternary Newsletter

I am now in the process of compiling contributions for the East Asian Tertiary/Quaternary Newsletter Number 9. News items concerning all aspects of scientific research on the evolution of environments in east Asia are hereby requested. These could include:

-- Abstracts of your own scientific research papers on topics related to the evolution of east Asian environments (including geology, climatology, botany, palynology, zoology, vertebrate and invertebrate paleontology, paleoanthropology, and archaeology);

-- Abstracts or titles of recent scientific research papers or books published in your speciality or geographical region relating to the evolution of east Asian environments;

-- Announcements of upcoming conferences or symposia relating to any aspect of the evolution of environments in east Asia;

-- News of geological, paleontological, archeological or other field work undertaken in east Asia;

-- News of collaborative research projects relating to the evolution of Tertiary/Quaternary environments in east Asia; and

-- Other announcements or news items that you think would be of interest to the readership of the Newsletter (e.g., grants, fellowships, awards or other prizes, requests for obscure publications, etc.)

In order that Newsletter Number 9 can be readied for publication early in 1989, I would appreciate receiving your contributions by November 15, 1988. The Newsletter will continue to thrive only with your committed and enthusiastic support.

Yours faithfully,

Nina G. Jablonski
Editor

THE EAST ASIAN TERTIARY/QUATERNARY NEWSLETTER

Compiled and published by the
Centre of Asian Studies
University of Hong Kong

No. 8 (April, 1988)

PURPOSE

As requested at the first Palaeoenvironment Conference at this Centre in January, 1983 and reiterated at the second Conference in January, 1987, this Newsletter is designed to contain short original contributions, news items regarding research projects in progress or planned, reviews of books, abstracts of current literature, travel by scientists, requests for information, etc.

Geographical scope: within the area bounded by 75° to 150°E. longitude to 20° to 50°N. latitude, but extending to adjacent regions when data are relevant to the core area. Geological time scale: from early to mid-Tertiary up to the emergence of man, but reaching back to earlier periods when considered relevant. In order that this project retain its impetus, all scientists within and outside east Asia are asked to provide (without regular reminders from the Centre) a statement of current activities, travel, publications and any other information likely to be of interest of their colleagues.

Materials may be sent to the regional editors, or direct to Professor E.K.Y. Chen, Director of the Centre of Asian Studies, for inclusion in forthcoming issues.

To: Centre of Asian Studies,
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Pokfulam Road, Hong Kong.

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! IN THIS POSITION SHOULD CONTACT THE EDITOR, DR. NINA JABLONSKI,
! AT THE ABOVE ADDRESS. FURTHER INFORMATION CAN BE OBTAINED FROM
! PROFESSOR WALKER.
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THE EVOLUTION OF THE EAST ASIAN ENVIRONMENT

Proceedings of the Conference:
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Edited by R.O. Whyte, T.N. Chiu, C.K. Leung and C.L. So

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THE PALAEOENVIRONMENT OF EAST ASIA FROM THE MID-TERTIARY

Proceedings of the Second Conference, January 9-13, 1987

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Oceanology: Changes in Coasts and Sea Levels

IGCP Project 200; INQUA Commission on Quaternary shorelines; Sea-Level Changes; Sea-Level Research; Sea Surface Studies; The coastal zone of China: a symposium; Closure of the Indonesian seaway; Middle Holocene Shoreline Map of Japan; Dinoflagellates from south India.

Palaeoclimatology

Quaternary Palaeoclimatology; Karakoram Hydrological cycle; Palaeoclimate Symposium, Ahmedabad; Saharan pluvial episode.

Palaeobotany

Plant extinctions; Evolution of the angiosperms; Cladistics and plant phylogeny; Miocene flora: origin of Betula; Woodsiaaceae; Phylogeny and speciation; Fossil diatoms; Spore-pollen from the Late Quaternary of Sichuan; Origin of Salix; Pleistocene palynology of Taiwan; Biogeographical Evolution of the Malay Archi-

pelago; Himalayan forests; Causes of endemism; Palaeobotany, palynology and Holocene sedimentology in West Bengal; Palynology of the Palni Hills; Arrival of northern temperate elements in Latin America; Systematics; Mangroves; Tropical vegetation in Asia; Flora Malesiana; Lecture course at Qingdao by Australian scientists; Radiation of the angiosperms; Reconstruction of holographic life forms.

Invertebrate Palaeontology

International Congress on Fossil and Extant Brachiopods; Late Cretaceous Foraminifera of Tibet; Marine Cretaceous of the Tarim basin; Molluscan fossils from Hokkaido; Miocene Foraminifera of central Japan; Globigerinida; Late Miocene carbon shift; Late Quaternary deltaic palaeoenvironments; Indonesia; Symposium on Palaeolimnology; Third International Symposium on Marine Biogeography and Evolution in the Pacific.

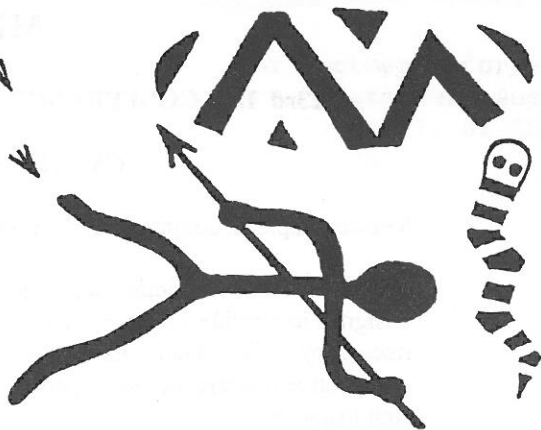
Palaeozoology

Asian mammalian stratigraphy for the Paleogene; Evolution of MtDNA and the molecular clock; Middle Oligocene ochotonids; Short History of Vertebrate Palaeontology; New Hyainodontinae from Mongolia; Miocene ape from Lufeng; Pantolambdodon from Ningxia; Agriotherium intermedium from Anhui; Pliocene mammals from Shaanxi; Megaceros from Ningxia; Gulo; Mastodonts from the P.R.C.; Fairservis and the Shabarakh project; Travels by Stanley Olsen; Miocene fish from the Siwaliks; Miocene Elephantoidea of Potwar; Miocene rodents; Miocene biologic events; Holocene reptilian remains from the Bengal basin; Pleistocene fauna from central India; Pleistocene fauna from northern India; Bos namadicus from the lower Godavari; Life history patterns in fossils; SEM analysis on dental enamel; SEM analysis of panda dental enamel; Ancestry of the giant panda; Early evolution of birds; Oligocene mammals from Inner Mongolia; Sino-German co-operation; Climatic variation and mammalian evolution, China; History of Quaternary mammals and astronomical factors; Southern Asian mammalian change; Quaternary vertebrate fossils from Nepal.

Palaeoanthropology

Hominoid sexual dimorphism; The Taung skull; Human and related higher Primate fossils from China; Origin of Homo sapiens sapiens; Origin of modern man; thermoluminescence dating from Israel; Hominids and their stone-tool assemblages; Palaeolithic tools from Zhoukoudian; The Archaeology of Ancient China; Palaeolithic from central India; Upper Pleistocene of Sri Lanka; Origins of man in Australia; Pliocene and Pleistocene hominids from Lake Turkana, Kenya; Dates for the Acheulean in East Africa; Glaciation as a selection pressure on the development of human intelligence; British Archaeological Mission to Pakistan; Paleo-Indian Studies; The Palaeolithic in Japan; Discovery of possible new Lufengpithecus sites in Yuanmou, Yunnan.

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Australian Archaeometry Conference.

MEETINGS

23rd IAG CONFERENCE, ADELAIDE, 13-16 FEBRUARY 1989

OR, THERE IS LIFE AFTER IGC

Venue: Napier Building, University of Adelaide

Format: The programme will take the form of a series of workshops, which are designed to provide a focus for conference activity, plus a number of general sessions as necessary. Conveners have been appointed for the following workshops and prospective conference participants should contact them for further information in the first instance:

Conference Secretary:

Dr Sandra Taylor,
Department of Geography,
University of Adelaide, Adelaide, SA 5001.
Telephone: (08) 228 5649 or 228 5943
Telex: UNIVAD AA 89141
FAX: (08) 22 40464

AUSTRALIAN AND NEW ZEALAND GEOMORPHOLOGY GROUP FOURTH CONFERENCE 6-10 FEBRUARY 1989

The second circular for this conference has now been distributed. It provides information on the background to the conference, submission of abstracts (deadline November 1st 1988), programme, accommodation, registration fee (\$50, also required by November 1st), field trips, conference dinner, and a registration form. Conference organisers are **Martin Williams, David Dunkerley, Jim Baxter and Brian Finlayson**. The venue will be the small town of Buchan in East Gippsland. For copies of the circular and further information write to

A.N.Z.G.G. 4th Conference,
Department of Geography and Environmental Science,
Monash University,
Clayton, Vic. 3168.

14-17 August 1989 Dunes '89 - Geomorphology and Ecology of Desert and Coastal Sand Dunes. Namibia. (Dr J.D. Ward, PO Box 2168, Windhoek 9000, Namibia.)

A Q U A Field Meeting Tentative Program

Jan 31st

2-5 pm Arrive field station

7 pm Evening meal

8.30-8.40 J. R. Dodson: Introduction

8.40-9.20 B. G. Thom: The Quaternary evolution of the
Myall Coast

For further information
see "Quaternary Australasia
Vol 6, No. 1, p. 58, or
John Dodson,
School of Geography,
University of NSW,
KENSINGTON, NSW 2033.

Feb 1st

7.00-8.00 Breakfast

9.00-4.30 Field day along the Seal Rocks to Tea Gardens
coast line.

7.00 Evening meal

8.30 Business meetings.

Feb 2nd

7.00-8.00 Breakfast

9.00-noon Talks by various people on current work.
The following have already indicated their
willingness to speak: Bill Boyd, Jane Chalson,
Donna D'Costa, Stephen Gale, Merna McKenzie,
Colin Murray-Wallace, and Phillip Kodela.
I plan to allocate about 15-20 minutes each
for these but they are meant to be informal
and anybody else who would like to talk is
welcome.

12.00-1.30 Lunch

1.30-2.10 Bob Galloway: The Cainozoic history of the
Barrington Upper Hunter region.

2.10-2.50 John Dodson: The Holocene vegetation and
environments of Barrington Tops.

2.50-3.30 Wayne Erskine: Holocene channel changes
reconstructed from valley-fill
lithostratigraphy in the
Wollombi Brook basin, Hunter
Valley.

3.30-4.00 Coffee

4.00-4.40 Len Dyall: The Bilubi excavations near
Nelson Bay.

4.40-5.20 To be arranged.

7.00 Evening meal.

Feb 3rd

This will be a long day!

6.30-7.30 Breakfast

8.00 Depart.

8.00-5.00 We shall travel in convoy to Gloucester
(petrol!) then across Barrington Tops to Scone
and south toward Newcastle along the Hunter
Valley. The roads are at worst good quality
forestry roads so don't be alarmed.

We shall endeavour to finish by 5.00 so that people can
make their evening accommodation plans in good time.

SECOND INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY

FRANKFURT/MAIN, FEDERAL REPUBLIC OF GERMANY

3-9 SEPTEMBER 1989

This conference will have much of interest for Quaternary studies. Four of the nine sections are particularly relevant viz.:

- Geomorphology and geoecology
- Neotectonics and structural geomorphology
- Climatic geomorphology
- Coastal geomorphology

There are also many fascinating field trips on offer to various parts of West Germany, East Germany, and other parts of western Europe; many will visit areas of classic Quaternary interest.

Copies of the second circular (14 pages!) are available from the editor of 'Q.A.' or from:-

2, ICG - c/o Prof. Dr. h.c. Arno Semmel,
Institut für Physische Geographie,
Universität Frankfurt,
Senckenberganlage 36, Postfach 11 19 32
D-6000 Frankfurt/Main
Federal Republic of Germany.

Registration is DM 200 until 31 Dec 1988 and DM 250 thereafter.

A COMPARISON OF VARIOUS CHRONOLOGIES APPLIED TO A
SIGNIFICANT EVENT

J. Ussher and A.N.Other *

School of Divinity, Trinity College, Dublin, Ireland
* Archaeometry Unit, Kalangadoo CAE, Kalangadoo, Australia

ABSTRACT

There is evidence that a major geological event occurred about 6000 years BP. If the production of C-14 began at this time radiocarbon dates need to be reassessed as a very low level of C-14 no longer implies a very old sample. It has been suggested that TL ages up to 100,000 years over-estimate the true ages because they do not take into account the "inherent TL" of the quartz acquired during its formation. A study of the TL of recently prepared quartz reveals the conditions necessary to produce "inherent TL".

INTRODUCTION

It has been suggested from the examination of various historical documents that a geological event of major significance occurred about 5991 years BP. Huntley (1980) has pointed out that if it is assumed that the production of radiocarbon did not begin until about 6000 years BP then there is no conflict between the Ussher chronology and radiocarbon dates for any time interval in the last millennium. Further, the presence of low levels of C-14 does not necessarily indicate that the sample being dated is of great age since a low C-14 activity would be found in organisms that died in the years after the production of C-14 began. Tests show (Smith et al. 1981).....

DISCUSSION

This short extract has been reproduced to illustrate the method of setting out your paper. It is printed in 12 pitch. Further details are given in the circular.

ACKNOWLEDGEMENTS

The authors thank Professor Archy O. Logy for a critical reading of the manuscript.

REFERENCES

- Huntley, D.J. 1980 "Radiocarbon dating. A bootstrapping fallacy."
Jour. Irreproducible Results 26:13-14.
- Smith, A.B., Jones, C.D. and Brown, E.F. 1981 "New dates for ancient bones." Arch. Rev. 7:34-39.

Contributed by the organisers of
Third Australian Archaeometry
Conference, Adelaide 29 Aug-1 Sep 1988.