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Australian Quaternary Newsletter

No.3 May 1974

From this issue on, there will be an annual charge of $1 (Australian) for the Australian Quaternary Newsletter, which we hope will continue with two somewhat irregular issues each year. Please fill in the form on the back page and send it in with your dollar. Those who have already paid will be credited for this year and will soon get a receipt.

Our new column, At the Core, commencing in this issue, is intended to present personal views of the Quaternary and those in it. It does not necessarily represent the opinions of the editors. Other contributions will be welcomed, either on new issues or in reply to those raised here.

Jeannette Hope
Bruce Thom

Research School of Pacific Studies
Australian National University

CALIBRATION OF RADIOCARBON DATES

The technique of radiocarbon dating has assumed a constancy of the atmospheric inventory of $C^{14}O2$. However, it has been shown that this inventory has fluctuated in the past. Therefore, for most periods, corrections must be applied to radiocarbon dates to adjust them to true ages. The corrections, presented either in the form of a calibration curve or in tables, have been derived from the C^{14} dating of tree-ring dated samples. Dendrochronology, by means of the process of cross-dating, has provided samples of known age, accurate to within a year. C.W. Ferguson working with brislecone pines in western U.S.A. has succeeded in extending the range of known-age trees to nearly 8200 years before the present.

The Applied Science Centre for Archaeology, Philadelphia, in a recent issue of the MASCA Newsletter (Vol.9, No.1, Aug. 1973) has published a calibration curve to 7350 years before present (5350 B.C.) The 631 radiocarbon dates of precisely dated woods included in this study were determined from dendrochronologically dated samples which covered 723 decades (1849 AD to 5383 BC). Copies of this Newsletter may be obtained from Richard D. Haynes
University Museum
33rd and Spruce Streets
Philadelphia, Pa. 19174
U.S.A.

MEETINGS

The 1974 May Biennial Conference of the *Australian Institute of Aboriginal Studies* will be held between 16th May and 2nd June in the H.C. Coombs Building, Australian National University, Canberra.

The following symposia will be held:

Schematisation in Art	16/17/18 May
Stone Tools as Cultural Markers - change, evolution and complexity	19/20 May
The Biological Origin of the Australians	21/22 May
Social and Cultural Change	23/24 May
Cognition	27/28 May
Ethno-classification	29 May
Languages of Cape York	30 May
Grammatical Categories in Australian Languages	31 May, 1/2 June

The aim of the conference is informed discussion, based on precirculated papers. Authors, Chairman and invited discussants will meet in one room, while non-contributors will "eavesdrop" on the proceedings by way of closed-circuit television in the Coombs Theatre. The proceedings of the symposia will be published by the Institute as books containing revised versions of the precirculated papers.

All interested persons are very welcome to attend, and copies of pre-circulated papers are available at cost from the Institute. Of particular interest to Quaternarists will be the symposia on Stone Tools, and Biological Origins of Australians. The latter will be introduced by four papers discussing the Pleistocene Background to Man in Australia by J. Chappell, J. Calaby, J. Bowler and J. and G. Hope.

The 3rd Biennial Meeting of the *American Quaternary Association* (AMQUA) will be held at the University of Wisconsin, July 30-Aug 1, 1974. The programme theme is The Holocene. For further information write to AMQUA, Centre for Climatic Research, 1225 W. Dayton Street, Madison, WI, 53706.

The next seminar of the *Victorian Quaternary Group* will be on Friday, 26th July 1974. The subject is Quaternary Climates and the convenor is Jim Peterson, Dept. Geography, Monash University. No subject has yet been decided for the following meeting, on Sept. 27th, but a day excursion is planned for Sat. 23rd November, to the Quaternary deposits of the Yarra and Werribee Rivers, and the coast and plains between. The general convenor for 1974 is Neville Rosengren, Dept. Geography, Univ. Melbourne.

The first circular for the *25th International Geological Congress* to be held in Sydney in August 1976 lists a number of topics of Quaternary interest. These include the Tertiary and Quaternary history of the Indo-Pacific Region, hydrogeology in arid areas, geological effects of late Cainozoic climates, and the laterite weathering process. For further information contact the Secretary-General, P.O. Box 1892, Canberra City, A.C.T. 2601.

PUBLICATIONS

The Proceedings of the *2nd International Symposium on Coral Reefs*, conducted by the Great Barrier Reef Committee, Australia, 1973, will be published in July 1974. Vol.1 includes chapters on Productivity, Population Strategies, Ecological and Palaeoecological assemblages, Toxins and Marine Pharmacology, *Acanthaster planci*, and Biogeography. Vol.11 covers Recent History, Sea Level change and Geomorphology, Carbonate Sedimentation and Diagenesis, Microstructure of Corals, Regional Studies and Zonation, Coral Settlement and Growth, Field and Theoretical Techniques and Conservation.

Each volume will cost A$20, for orders received before June 20th 1974, and A$25 for orders received after that date. The books can be ordered from Dr Patricia Mather, Queensland Museum, Gregory Terrace, Fortitude Valley, Brisbane 4006, Queensland.

CAVING LITERATURE IN AUSTRALIA

Caves have always been important in Quaternary research, because of their geomorphology and sediments which often include archaeological and palaeontological material. In Australia caving - speleology - is becoming more popular. There are many local caving societies, and 21 are affiliated with the Australian Speleological Federation (ASF). Many of the societies are interested in scientific aspects of caves, and several have become active in conservation. Conservation movements such as those to save Colong Caves and Bungonia Gorge in NSW, and Mt Etna in Queensland have often been initiated by caving groups, and certainly the enthusiasm and hard work of cavers has been essential to these campaigns.

There are many caving publications of relevance to Quaternary workers. Most societies put out journals of varying standards, and the best of these are very good. The Sydney Speleological Society (SSS), for example, requires a small research project to be completed before full membership is granted, and the results of these projects are often published in the S.S.S. Journal. The *A.S.F. Newsletter*, a quarterly, publishes news from the various societies, as well as general articles about cave exploration, conservation etc. In 1968 A.S.F. published *Speleo Handbook*, a guide to

caving in Australia (and New Guinea). As well as general notes on such topics as geology, surveying and climbing equipment, this listed all the then known caves in Australia and New Guinea, giving brief descriptions of each, with references. Unfortunately this book is now out of print, but a revised edition is reported to be under way. The *A.S.F. Newsletter* can be obtained by sending an annual subscription of $1 to the treasurer, John Taylor, 7 Orange Grove, North Essendon, Victoria 3041. It contains the names and addresses of all the affiliated local societies.

The Sydney Speleological Society has several publications of interest to Quaternarists. *Australian Speleo Abstracts*, which has appeared twice a year since December 1970, abstract articles in most of the caving journals and in some scientific journals. Articles are abstracted in the following categories

1. Caves
2. Biology and Anthropology
3. Physical and Earth Sciences
4. Conservation and Tourism
5. Technique and Documentation
6. Miscellaneous

Australian Speleo Abstracts can be obtained from 89 William Edward Street Longueville, N.S.W. 2066. Annual subscription is $1.75 for non-members of ASF and $2 for institutions.

SSS also publishes *Occasional Papers*. The first two are out of print, and contained several short articles. The remainder are

No.3 Chillagoe Caves, North Queensland
No.4 Bungonia Caves
No.5 Australasian Speleo Map Index No.1

Bungonia Caves is a very well-produced book covering the history and exploration of the area, descriptions and maps of the caves, and a variety of scientific articles. The book is part of a conservation campaign against the indiscriminate mining of limestone in the Bungonia Gorge, and is a remarkable example of what can be done by a small group of people without institutional backing. The *Speleo Map Index* lists maps of limestone areas and caves throughout Australia, Papua New Guinea, New Caledonia and New Zealand, and should be of value to anyone involved in geomorphological research. Copies of these publications can be obtained from the Sydney Speleological Society, P.O. Box 198, Broadway, N.S.W. 2007.

There is one Australian journal concerned specifically with scientific research relating to caves. This is *Helictite*, a quarterly, which can be obtained from the Editor, "Helictite", P.O. Box 183, Broadway, N.S.W. 2007. The annual subscription is $2.50. For the past 10 years *Helictite* has been edited by Dr Aola Richards, Dept. Zoology, University of NSW, and Mr E.A. Lane, Deputy Director of Information Services, Australian Atomic Energy Commission. Last year Dr J.N. Jennings, Dept. Biogeography and Geomorphology, A.N.U. and Mr J.R. Dunkley, editor of the ASF Newsletter, joined the editorial panel. *Helictite* has published papers on a wide range of topics, geological, biological and archaeological. It also abstracts articles on caves from Australian and international journals.

The journal uses offset printing with good reproduction of line drawings and photographs. Anyone interested in the Quaternary of Australia should subscribe to *Helictite* and consider it as a potential journal for publication.

QUATERNARY EXHIBITION

'Late Quaternary Australia - the last 50,000 years' opened successfully at the National Library in Canberra in March. It has been temporarily removed but will be re-erected in late June and will remain on display until late August. It will probably then tour other state capitals, with a first stop at the Macleay Museum, University of Sydney.

The exhibition is now being produced in book form by the ANU Press, and will include an introductory essay by Prof. D. Walker, Dept. Biogeography and Geomorphology, ANU. It will be aimed at senior high school students and interested laymen.

AT THE CORE.....

A report on the IX INQUA Congress, Christchurch, N.Z.

Who didn't go to the IX INQUA Conference at Christchurch last December? Although Australians packed the conference out, there were many absent faces, and a belated review of the whole bun-fight may help you decide whether or not to start saving for you 8th class seat in an overloaded DC10 to go the Birmingham for the Xth Congress in 1977.

It was pretty clear from the non-Australian - N.Z. component that only heavy-weights who could have their fare paid had come from other countries; the conference was apparently much smaller than those of Paris and Boulder, and included a quota of professional conference-goers. Of course, as any administrator will swiftly inform you, to get your fare and high fee ($45) paid, you have to talk - the bohemian concept that it is informal contact and unscheduled group discussion that actually serves to transfer information is not quantifiable in dollar terms.

The result was a disappointing crush of contributions, up to ten papers in marathon 3 hour sessions. Most chairmen and contributors could also be criticised for the total lack of pre-session planning, so that many speakers had to be cut off short, leaving no time for questions, let alone discussion. In particular, there were almost no opportunities for comparing results from different contributions; the audience just absorbed a quick succession of nuggets of information with a little room for methodological questions. The archaeologists revolted and did organise some true symposia in which the papers were integrated and the discussion ranged over all of them. Some of the regional New Zealand papers, on tephrochronology or glacial chronology, were also interrelated, as local controversies boiled to the surface.

The foregoing comments do not, of course, reflect on the quality of the papers, many of which were excellent, but on the frustration at having each course taken away and the next served before one could pick up the cutlery. The simultaneous timetabling of related subjects also raised some ire, but this was to some degree inevitable. As it was, each paper

was punctuated by a stream of people leaving and another group surging in; the most annoying feature being that not all groups followed the same time-tabling so that the ebb and surge was often in mid-paper.

The Australian contingent distinguished itself by comparison with the New Zealanders and Northern Hemispherians by generally ignoring correlation, and by not attempting to mould their data into existing world schemes. This was probably just as well in view of the many new pieces of information that came to light; the Australian jigsaw puzzle is still not ready to be assembled.

The inner man and woman fared quite well once the worst varieties of N.Z. beer had been avoided, and the invention of the "Trans-Tasman" (13oz Fosters to 26oz Waikato 4X) had spread widely. The university staff club was popular and it was here that cross-disciplinary discussions took place. A small canteen was conveniently located within the conference building, and towards the end of the week the crowd of canteen longers often outnumbered the audience, as other national groups discovered the concept of morning and afternoon tea. Again, discussions at the canteen tables were often more productive than those in the conference rooms.

The Wednesday excursions by bus and train were well organised, and a pleasant relief from the papers, that to the Moa hunting sites at Pyramid Valley being the most popular. However these were followed on Thursday night by the Congress Dinner which epitomised the congress program. The entire congress was individually introduced to the Organisers and then served individually (i.e. by one person only) at a buffet. Peculiar white and pinkish fluids (known locally as wine) were available, and also fortunately beer and spirits. The ravenous throng thrust 15 deep against the dinner table while an aghast staff tried to keep them in single line. All participants were stunned, many escaping from the crush to attack the afters first, and others despairing entirely. The Quaternary narrowly avoided losing all its scientists.

So to go to Birmingham in 1977 or not? If it occurs to the English to have regional excursions on the magnificant scale of New Zealand (these included tours in New Guinea and Australia) then we can look forward to pre- and post-congress tours to Samarkand and Dahomey. As all the people who couldn't afford to come to N.Z. will go to Birmingham, the official program is likely to be even more crammed and indigestible than that of Christchurch, but there will be still more people to meet over a warm beer (probably £2 a glass by then). INQUA has really become too big for everyone who goes to have a say; if you do go the people may well be better value than the meetings themselves.

G.S. Hope

LAKE MUNGO

Lake Mungo in the Willandra system of western N.S.W. has yielded a wealth of environmental and archaeologic data. The site of one of the youngest known palaeomagnetic reversals (Barbetti & McElhinny 1972, Nature, V.239, 327), it has also provided the oldest dated human remains in Australia (Bowler *et al* ., 1972, Nature, V.240, 48). Assisted by a grant from the Australian Institute of Aboriginal Studies, archaeological and stratigraphic analysis have continued under the supervision of Professor Mulvaney, Dept. of Prehistory and Anthropology, S.G.S., A.N.U., and Jim Bowler , Dept. Biogeography and Geomorphology, ANU.

Early in 1973 Bowler took a series of aerial photographs of the Mungo lunette and associated archaeological sites using two synchronously operated 70 mm cameras mounted in the floor of a light aircraft. From simultaneous black and white and ektachrome images maps have been produced by John Magee showing soil-stratigraphic horizons on the eroding lunette surface at a scale of 1 : 300. This enables surface finds of artifacts, bone and other environmentally significant evidence to be plotted to an accuracy of about 50 cm. Since the age of the soils and other stratigraphic marker horizons have been dated now by some 80 radiocarbon dates (including the contributions from 3 Ph.D theses, those of Harry Allen, Mike Barbetti and Bowler) it is now possible to use chronologic and stratigraphic analyses in a predictive sense with a high degree of reliability.

A preliminary archaeological investigation in the August-September vacation of '73 by John Mulvaney and his students produced a trench on the lunette some 5 metres deep. This yielded the first controlled and detailed archaeological section through the entire Mungo unit. *In situ* tools were found down to the basal gravels which contained rolled artifacts. Dating of this ancient sequence is being assisted by the work of Dr Rajaguru visiting from the Indian Institute of Archaeology, Poona. By sampling a series of trenches dug to 3 m using a tractor and back-hoe, he is identifying soil-sedimentary horizons using chemical and micropedologic techniques to correlate them with sections of known age.

Recent work by Jim Bowler uncovered another skeleton from the Mungo unit only some 500 metres from the original cremation site. Alan Thorne, Dept. of Prehistory, R.S.Pac.S., A.N.U., excavated the remains and is presently analysing their anatomical significance.

Additional excavations are planned for the May and August vacations this year assisted by Wilfred Shawcross and Dr Isabel McBryde both of whom have recently joined John Mulvaney in the Department of Prehistory and Anthropology.

RESEARCH REPORTS

The following reports have been grouped on the basis of the state (or country) in which the field work has been done. For projects of a more general nature, the report is included under the state where the worker is located.

QUEENSLAND

Peter Kershaw has recently been awarded his PhD from the ANU for work in biogeography centred on the Atherton Tableland, North Queensland. His pollen analytical investigation of organic deposits in Pleistocene explosion craters provides the first well-dated and continuous record of environmental change in tropical Australia. Many of the craters seem to have been dry prior to 9000-11,000 years ago; these provide a record of the arrival of rainforest vegetation 9000-7000 years BP, and the changes in forest composition since then, which may be related to minor climatic variation.

At one site, Lynches Crater, the early aridity was evidently not sufficient to dry out the crater lake and a pollen record going back to more than 60,000 years was obtained from a 20 m core. In an attempt to bottom the crater sediments last August, a 44 m power auger was used. This brought up only organic lake sediments with no sign of the base. This site thus probably contains over 150,000 years of continuous record, and should provide a palaeoenvironmental section of unmatched importance for the sub-tropics of the southern hemisphere. Peter, now a lecturer in the Dept. Geography, Monash University, is slowly working on this long core. He would be interested to hear details of methods to determine the underlying crater profile prior to further drilling.

NEW SOUTH WALES (including A.C.T.)

Alan Carter, Dept. Oceanography, School of Applied Geology, U.N.S.W., is continuing work on detrital shallow water benthonic foraminifera in the abyssal plain deposits, in the hope that they may yield information relating to Quaternary history. He participated in Leg 27 of the Deep Sea Drilling Project in the eastern Indian Ocean in Nov-Dec 1972, and has contributed to the initial reports volume of Leg 27.

Dr C.W. Ferguson, Laboratory of Tree-Ring Research, University of Arizona, will be at the Dept. Biogeography and Geomorphology, ANU, until 1 July 1974. His general objective is to become familiarised with present and past tree-ring studies in Australia and to explore the potential for expansion in terms of climatology, archaeological dating and the calibration of the C^{14} time scale. He would like to obtain references to any studies of tree-rings (or utilising tree-rings) in Australia. An unpublished bibliography of dendrochronology in New Zealand is available on request.

VICTORIA

Fossil marsupials from rich bone beds at Lancefield, near Melbourne were described by Richard Owen in 1844, but the locality had been almost forgotten until recently investigated by Rob Glennie, and Phil Macumber (Victorian Dept.Mines). In January 1974 they made some preliminary excavations with help from palaeontologists from Monash University and the National Museum. A large quantity of bone was recovered, including several hundred jaws of *Macropus titan*, a large extinct kangaroo, as well as a few specimens of *Protemnodon* and *Diprotodon*. The bones occur in a layer of gravel overlain by about one metre of peat in a small swamp around a permanent spring. Some stone artefacts were also found. This site is clearly ideal for a multidisciplinary study involving palaeontologists, archaeologists and palynologists.

Another find of fossil marsupials has been made at Bacchus Marsh. Here the skeletons of about 15 diprotodonts have been recovered from a clay pit. The skeletons are in very good conditions, and in some cases the bones are still articulated. One almost perfect skull is on display at the National Museum in Melbourne, and the rest are being prepared there.

Bernie Joyce, Dept. Geology, Univ. of Melbourne, will be on study leave in London from 1st June 1974, to the end of Feb. 1975. He plans to visit volcanoes in Iceland, and attend the Soil Congress in Moscow in August.

WESTERN AUSTRALIA

D. Merrilees and C.E. Dortch, Western Australian Museum, have been working for some time on an archaeological site at Devil's Lair, in the southwest of Western Australia. Excavation in the cave has revealed a deposit spanning the time period of about 12,000 to 25,000 years ago. The archaeological material includes stone artefacts, bone points and a bone bead, as well as a human tooth. There is also a rich collection of faunal remains, especially mammals, but so far none of the large extinct marsupials have been found there. Two reports have already been published on this site: J.Roy.Soc.W.A. Vol.54 (4), 1971, and Archaeology and Physical Anthropology in Oceania, Vol.8 (2), 1973; a third, dealing with the fauna, will appear later this year.

SOUTH AUSTRALIA

Roger Leubbers is continuing the archaeological investigation of Wyrie Swamp, mentioned in the last Newsletter. Excavations were extended in January, when it became known from commercial quarrying that wooden implements were present in the peat. After three weeks excavations, running neck and neck with power shovels, a team of students located over 25 wooden artefacts from layers of peat dated to 10,000 and 9,000 years old. Seven of these have been identified as boomerangs, one of which is made from a root of *Casuarina stricta*. Other wooden implements found were digging sticks, straight shafted spears and one single-barbed spear tip. Stone artefacts found in association number over one hundred. It is believed that they were used not only to fashion certain wooden tools, but also to collect and eat various plants growing in shallow water around the edge of the bog.

Palaeobotanical studies of Wyrie Swamp by John Dodson (Dept. Biogeography and Geomorphology, ANU) seek a reconstruction of the bog's early history using fossil pollen. Basal dates from other bogs in the area suggest that aquatic conditions suitable for peat formation only began in the region about 8000 years ago, whereas water began accumulating at Wyrie 10,000 years ago. Wyrie Swamp seems to have been a site for prehistoric food collection because it contained water when nearby bogs were dry.

Mike Plane (BMR, Canberra) and Mike Woodburn (Riverside University of California) will be spending July and August in the Lake Eyre Basin collecting fossil marsupials. Their interests are basically in the Tertiary faunas of the area, and they will be working at Lake Palankarinna. Quaternary sediments and fossils are also abundant in this area.

The Flinders University Earth Science Marine Geology Research Group has sent the following dispatch: Chris von der Borch, studying stratigraphy and mineralogy of modern dolomite formation, Coorong area, South Australia, is carrying out detailed coring of carbonate lakes from a variety of environments near the Coorong Lagoon. Mineralogical variations down the cores are being determined semi-quantitatively by X-ray diffraction in order to outline the processes of formation and diagenesis of minerals such as dolomite, magnesite, magnesian calcite, aragonite and hydromagnesite. The origin of the amorphous silica in these carbonates is also being sought. The source of ions for carbonate and silica formation appears to be shallow groundwaters, so the hydrology and water balance of the lakes is also being studied.

Doug Schwebel is well underway on a PhD project studying the stratigraphy, mineralogy and Quaternary history of the seaward half of the coastal plain of southeast South Australia. He is in the process of coring the interdunal flats and the stranded barriers and ultimately hopes to relate the events to the history of Quaternary sealevel oscillations. He will attempt U/Th dating on Pleistocene lagoonal aragonites from the area.

Herb Veeh now has his U/Th dating equipment operational and is actively working on dating raised coral terraces from Timor in order to add more detail to the sealevel curve of the past 120,000 years. He is also gearing up to study growth rates and trace element compositions of reef-building corals that grow in St Vincents Gulf, South Australia. He considers that the marked seasonal climate variations in the relatively high latitude (for coral) of 35°S may leave its mark in the form of growth rings. These may be more accentuated than those occurring, for example, in mid-Pacific corals where seasonal climatic flunctuations are minor.

TASMANIA

M.K. McPhail (Botany Dept., University of Tasmania) is currently writing up his PhD project on vegetation histories and palaeo-environments since the late Pleistocene in the Tasmanian mountains. This work provides the first clues on palaeoclimates, from pollen analyses of eight sites. At five of these (950-1150 m altitude), material more than 10,000 years old was recovered, and analysis of this suggests that there was a regional vegetation of sparse grass-land with chenopods. This indicates steppe-like conditions, at least on the Central Plateau of Tasmania, and hence supports the concept of a more extreme rainshadow effect from the west in glacial times. The cirque sites reveal that the alpine flora was largely eliminated after 10,000 years by the arrival of *Eucalyptus* sub-alpine woodlands followed by *Nothofagus cunninghamii* thicket, reflecting a rise in the treeline and presumably also temperature and precipitation.

NEW GUINEA AND INDONESIA

Peter Bellwood, Dept. Prehistory and Anthropology, S.G.S., ANU will be in the Talaud Islands, Eastern Indonesia, from May to August 1974. He will be locating and excavating early Neolithic sites in this area, which lies in a strategic situation between the Phillipines and New Guinea.

Geoff Hope, Dept. Biogeography and Geomorphology, ANU, has been awarded a Queen Elizabeth II Fellowship to continue his work on vegetation history and glaciation in New Guinea. He will be accompanying the Bernice P. Bishop botanical expedition to Irian Jaya from Oct. 1974 to Jan. 1975, and hopes to visit Mt Jaya (Carstensz) and Mt Mandala (Juliana).

G.J. Bartstra, Biologisch-Archaeologisch Instituut, Rijksuniversiteit, Groningen, Holland, spent Sept. to Nov., 1973 studying, with members of the National Archaeological Institute of Indonesia, the late Pleistocene Patjitanian industry of Java. Some excavation was carried out to unravel the complex stratigraphy of river terraces where Patjitanian artefacts have been found. Reconnaissance trips were made to raised beaches on the south coast, other river terraces, and to Sangiran, the famous *Pithecanthropus* site north of Surakarta. Further excavations in gravel deposits in karst depressions west of Punung yielded previously unknown artefacts, much smaller than the Patjitanian artefacts. An account of earlier research in this region has been published in the *Proc.IXth Intern.Cong.of Anthropology and Ethn.Sciences*, Chicago, 1973.

QUATERNARY SHORELINES

1972-73 Research on Quaternary Shorelines in Australia and New Zealand - a Summary Report of the ANZAAS Quaternary Shorelines Committee.

Introduction

The Quaternary Shorelines Committee was established in 1947 and since that date has reported on research projects and results concerning Quaternary sea levels in the Australian and New Zealand region. The report which has been prepared for each ANZAAS meeting has served a very useful purpose for disseminating information both within the region from which it comes and on a world-wide basis. In recent years however there has been reluctance on the part of some members and research workers to have their work reported at the compilation stage. For this reason, it is the majority feeling of the Committee that publication of research in progress in *Search* will be discontinued. Instead, subsequent to each ANZAAS meeting it is hoped to indicate research programmes in progress in each state in a report in the Quaternary Newsletter. It is further hoped that a resume of published work and comment will continue to appear in *Search*.

New South Wales

Dr B.G. Thom from the Australian National University is undertaking a detailed investigation of sectors of the Inner and Outer barrier system, and is running transects with a newly acquired A.N.U. drilling rig. He is concerned with evidence relating to both the mode and time of formation of the barrier systems. Dr R. McLean, also of A.N.U. is combining with Dr Thom in a process study at Moruya Beach on the South Coast. Beach profiles are being surveyed at fortnightly intervals with the object of studying the relation between wave regime and beach profile.

Mr R.W. Kidd of Macquarie University is beginning a study on the sedimentary budget of coastal inlets, and has begun by a reconnaissance study in which he has classified various inlets on the N.S.W. coast.

In the University of Sydney, Mr G. Bowman is continuing with his research on a study of the development of podzol soils in N.S.W. Outer Barrier sands. Considerable morphological and chemical differences have been found between the podzols of the landward and seaward sides of the barriers and these differences are being related to C^{14} dates as well as to environmental factors that might have affected soil development. Sampling of further sites (including cliff-top podzols) and analyses of samples is proceeding. Mrs Flora Turton (also of Sydney) is proceeding with her study on Tuggerah Lake, and is presently examining a subaqueous terrace. Professor Langford-Smith is continuing his long-term research on the Inner Barrier system near Evans Head on the North Coast, and is dating drift-wood samples in association with Mr H. Polach and the other workers from the Australian National University and Professor J. McGarrity of the University of New England.

In the University of New South Wales a project on off-shore sediment movement has been curtailed following Dr T.W. Healy's transfer to New Zealand.

Mr P. den Exter of the University of New England is now completing his study of the Inner Barrier system in the Camden Haven area of New South Wales North Coast.

T. Langford-Smith

Queensland

In Moreton Bay near Brisbane Mr E.R. Lovell, (Department of Zoology, Queensland University) is studying the beach ridges and associated elevated (2 m) beachrock on St Helena Island to determine the nature of past marine environments. A C^{14} date of 2540±85 years B.P. (GaK - 477)) is of interest when compared to the date of 3710 years B.P. for the controversial raised reef on Peel Island (see Gill and Hopley, 1972; Thom *et al* 1969, 1972).

In North Queensland, work carried out during 1973 has shown that there is also a distinct lack of evidence for Holocene sea levels higher than 1 m in the Cumberland Islands stretching 80 km from Penrith Island in the south to Hayman Island in the north. This work is a continuation of the programme of Dr D. Hopley (Department of

Geography, James Cook University of North Queensland) on raised beach rock levels on North Queensland islands. Although intertidal beach rock is ubiquitous only Cockermouth Island displayed high levels (at 5.5 m and 1.1 m) but the fretted and weathered nature of this material together with the presence of solution pipes going down below present reef flat level, strongly suggests a Pleistocene age. Dates obtained to date range from 6980±130 years B.P. (GaK - 4643) to 15640±490 years B.P. (GaK - 4644), apparently confirming the Pleistocene age.

A sharp break occurs at the northern end of the Whitsunday Passage, for islands to the north and west display high beach rock terraces. In the Bowen area, two have been examined in detail. On Middle Island two terraces at c.3.0 m and 1.0 m above MHWS have been dated to 4410±100 B.P. (GaK - 4234) and 3840±95 B.P. (GaK - 4233) respectively. On Holbourne Island, a series of distinct terraces have the following approximate heights (from landwards) 2.4 m, 3.4 m, 2.4 m, 1.8 m, the inner 2.4 m terrace producing radiocarbon dates of 5980±120 B.P. (GaK - 4236) and 6020±130 years B.P. (GaK - 4741). Work is continuing in these islands.

Dr E. Frankel (Department of Geology, Sydney University) has also recently worked on the marine geology, recent sedimentation and palaeogeography in the Edgecumbe Bay area, and has also completed a similar survey of Princess Charlotte Bay, further north. Results of this research should further help to determine the Quaternary history of the North Queensland coast. Dr Frankel is at present working in the Torres Strait region. Mr L. Taylor of the same department is working on the sediments of the Coral Sea Basin and Queensland Plateau.

During the latter part of 1973 the Royal Society - Universities of Queensland expedition to the Great Barrier Reef was organised under the leadership of Dr D.R. Stoddart (Cambridge University). Detailed geomorphological mapping, drilling, sediment sampling and geophysical survey in the area Cairns to Cape Melville, and less detailed study as far north as Cape Grenville, should produce results in the near future.

In the Townsville area Professor A.L. Bloom (Cornell University, visiting James Cook University) is coring mangrove swamps to document Holocene sea level history.

D. Hopley

South Australia

Professor C.C. von der Borch, School of Earth Sciences at Flinders University informing that Quaternary research at Flinders University is currently concerned with the geological record of Pleistocene eustatic sea level oscillations in South Australia, including the stratigraphy and sedimentology of the aeolianite sequences of the Central and Western portions of the State's coastline and the drilling of the sequence of stranded barrier islands and lagoons on the 65 km wide coastal plain in the southeast portion of the state. The facilities for dating biogenic carbonates using the U/Th technique are being set up by Dr H.H. Veeh and will provide absolute dates of

sequence and events. This work will, over the next few years, provide further refinements of current knowledge of Quaternary eucstatic sea level oscillations.

R.P. Bourman

Tasmania

Investigations of Quaternary stratigraphy on the South Arm and Tasman Peninsula in southeastern Tasmania have revealed several marine formations and associated terrace levels of probable interglacial age. The marine deposits are stratigraphically overlain by an extensive fossil soil and in places by thick slope deposits. The age of the soil is not known.

A C^{14} date of 29050±830 B.P. (SUA - 154) on charcoal from near the base of 17 metres of slope deposits resting upon a fossil cobble beach at Remarkable Cave, Tasman Peninsula suggests a probable last interglacial origin for the cobble beach. Several organic horizons within the slope deposits remain to be dated but should provide a series of dates for the last 30,000 years.

A site a Pipeclay Lagoon on the South Arm Peninsula shows marine clayey sands overlain by two thin organic horizons overlain and sealed by a fossil soil, some 2-3 metres thick developed on aeolian sand. Four assays on the organic deposits yielded dates ranging from 19840±280 B.P. to 25420±460 B.P. (SUA - 151 -- SUA - 153). The dates indicate that the deposits are of pre-Holocene age, but as the organic material has probably been contaminated by humic acids, the true C^{14} age is probably infinite, and the marine deposits therefore of Last Interglacial age.

At Mary Ann Bay near the distal end of South Arm Peninsula fine sands with a shell fauna occur up to 20-23 metres above OHWS tides. This site is being further investigated.

The mapping of marine terraces at Devonport, reported last year is being continued.

N.K. Chick & E.A. Colhoun

Victoria

Interstadial Higher Sea Level?

Milliman and Emery and others have suggested a sea level higher than now 30,000-35,000 years ago. A contrary view has been put forward that there were no interstadials with higher sea levels, and that the last Pleistocene higher level was Last Interglacial. The dates 30,000 years have been explained as due to problems of radiocarbon assay. Marine shells of Last Interglacial age with only a trace of contamination will give finite radiocarbon dates. An attempt was made to test this matter in Victoria.

1. Sale District, E. Victoria A C^{14} date of $28{,}000^{+1700}_{-1300}$ B.P. was obtained from well-preserved shells of *Ostrea sinuata* from west of Lake Melanyara from the bottom of a large drain beside the road 1.6 km E.N.E. of Sale (Military map 112, 043). However, an average of eight U/Th assays by J.C. Schornick gave 101,000 year.

2. Warrnambool, W. Victoria. Wellpreserved marine shells from the base of an aeolianite dune on the east side of the Hopkins River estuary 0.4 km north of the bridge gave a C^{14} date of $30{,}700^{+2400}_{-2000}$ year. U/Th assay by B.S. Amin gave an age of 400,000 year.

3. Port Fairy, W. Victoria Many years ago leached marine shells found on the east side of Goose Lagoon near the Princess Highway 8 km west of Port Fairy gave a radiocarbon date of 22,850±750 year. Subsequent mapping has shown that the deposit is part of the Port Fairy Calcarenite of Last Interglacial age, dated 125,000 year by U/Th (J.W. Valentine).

4. Port Campbell, W. Victoria At Two Mile Bay west of Pt. Campbell, marine shells on an emerged platform in Miocene limestone that are dated Last Interglacial palaeontologically gave a C^{14} age of 30,000 year.

So far no evidence has been found in Victoria of a higher sea level 30,000 year B.P. The Warrnambool/Port Fairy area is a geophysical high of great tectonic stability where even the Miocene strata are still horizontal. This is a very suitable area for the preservation of evidence of such a higher sea level, but none has been found.

E.D. Gill

Representation on the Quaternary Shorelines Committee is:

New Guinea: Mr W. Manser, Department of Geology, University of Papua and New Guinea.

New South Wales: Professor T. Langford-Smith, Department of Geography, University of Sydney.

New Zealand: Mr J.C. Schofield, N.Z. Geological Survey, Papapatoetoe, New Zealand.

Queensland and Northern Territory: Dr D. Hopley, Department of Geography, James Cook University, Townsville.

South Australia: Mr R.P. Bourman, Department of Geography, University of Adelaide.

Victoria: Mr E.D. Gill, 1/47 Wattle Valley Road, Canterbury Victoria. 3126.

Western Australia: Dr B. Logan, Department of Geology, University of Western Australia, Perth.

Dr. D. Hopley
Hon.Secretary