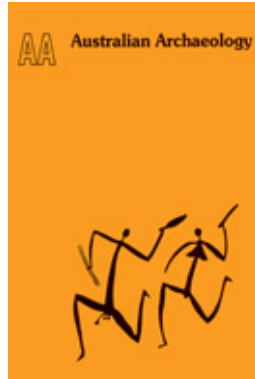


Australian Archaeology



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Full Citation Details:

Jones, R. 1975. Research Report for 1974, by the Department of Prehistory Research School of Pacific Studies. 'Australian Archaeology', no.2, 49-56.

RESEARCH REPORT FOR 1974, BY THE DEPARTMENT OF PREHISTORY
RESEARCH SCHOOL OF PACIFIC STUDIES

INTRODUCTION

The Department is concerned with the prehistory of the Indo-Pacific region. Within this vast and complex province, whose prehistory extends from the lifetime of still living peoples back to the Javanese gravel beds of several million years ago, we do, of course, have to specialise. Over the past few years a bifocal pattern has emerged in our department's research efforts. One arm concentrates on Australia, on the ecology of hunters and the technology of the 'stone age'; the other on Melanesia, on the society and economy of gardeners. This division, which might at first hearing, seem to echo the 'savagery' and 'barbarism' of Victorian scholarship, is purely an organisational one, and is not intended to be a statement of an intellectual position. Indeed quite the reverse, for what we are trying to seek are cultural generalities which transcend the particularities of tribe or of millenium.

Modern archaeology, more perhaps than most subjects is an amalgam, or as our enemies would see it, a rag bag of disciplines. Exemplifying this catholicity is the fact that the department consists of people whose training has been in physics, geology, classical archaeology, zoology, social anthropology, dentistry, classics, chemistry, art, demography - and even - prehistory. On the one hand we have played a major role in staffing and supporting the University's radiocarbon laboratory and on the other, have carried out research which once was the preserve of archivists, ethnographers or historical architects. This diversity of background and interest, coupled with the heady impetus of basic discoveries, contributes greatly to the sense of intellectual excitement which most prehistorians and their co-workers in this country are feeling at the moment.

During the year, research was carried out in the following areas; the original human colonisation and the later man-environment relations in south eastern Australia, including Tasmania and Kangaroo Island; the ecology and camp site geography of modern Aboriginal hunters in the Central Desert and Arnhem Land; the evolution of horticultural systems in the New Guinea Highlands; the articulation and history of sea-borne trading systems in the coastal mosaic of Melanesia; development of absolute and relative dating methods involving radioactive isotopes, thermoluminescent energy, ion diffusion rates and shell growth rings; the ecology of Pleistocene faunas, including the problem of the extinction of the 'giant marsupials'; and the implication of recent human palaeontological discoveries in the region to the broader question of the evolution of modern *Homo sapiens*.

Within the University, we have forged close links with our sister department of Prehistory and Anthropology in the School of General Studies. Prehistorians from both departments have jointly contributed to a weekly seminar series which we trust will be a permanent institution. Outside the University we have played an active role in the field of public education be it via Government agencies, the media of television, radio, exhibitions, newspapers, scientific journals, or direct talks to groups both formal and informal. We feel that the rapid dissemination of accurate results of current research is part of our responsibility as scholars and citizens, one made more urgent by the slowly awakening awareness of the complexity and vastness of the prehistory of the region in which we all live.

RESEARCH PROGRAMME

Man-land relationships in southeast Australia

For many years, the department has pursued a systematic programme of research into prehistoric man-land relationships in south eastern Australia, extending from the time of European contact, back to about 35-40,000 years ago, the earliest known dates for human occupation of this continent. Such antiquity has been gained at the Mungo and related sites in western N.S.W., where initial archaeological work was done by H. Allen and R. Jones. Although the archaeological component of this project has now been taken over by D.J. Mulvaney and his team from the Department of Prehistory and Anthropology in the School of General Studies, the department has continued its collaboration in the radiometric, palaeontological and physical anthropological fields with contributions by H.A. Polach, J. Hope and A.G. Thorne.

Major new discoveries have been made at this complex of sites but since they have not yet been fully analysed nor published, they will not be reported here.

Other major projects initiated several years ago such as R.J. Lampert's work on the south coast of N.S.W. and Jones' in Tasmania are still being pursued. Lampert analysed his excavated material from Bomaderry Creek, which yielded interesting floral dietary evidence in the form of macrozamia husks. Jones gave further thought to the implications of the Tasmanian evidence to some of the broader issues of Australian prehistory. He helped to reconstruct a full sized replica of a Tasmanian bark water craft which was successfully launched into the sea at Rocky Cape, probably the first such launching for a 100 years.

In three newer projects, striking success was achieved. R. Luebbers' salvage excavation at Wylie peat swamp, South Australia yielded an industry consisting of both wooden and stone tools, dated to being just under 10,000 years old. The wooden tools, including several boomerangs, spears and digging sticks are

an unique find, and revolutionise our concepts of the technology of late Pleistocene Australians. The boomerangs in particular are an important indicator of the continuity of Aboriginal technological traditions back to at least this period and indicate that even by then their makers had mastered the aerodynamic properties of aerofoil sections. These wooden finds are being conserved in the laboratory by W. Ambrose using the freeze-drying method which he invented. Ambrose, Luebbers and D. Markovic are making accurate records of the shapes of these fragile objects using photographic techniques utilising narrow slits of light projected onto each surface. The work at Wyrie is but one aspect of Luebbers' broader project involving a reconstruction of coastal settlement in south east South Australia with reference to resource procurement strategies through time. As part of this work he is co-operating with John Head in callibrating C¹⁴ dates obtained from marine shells of various species against those from charcoal.

With S. Bowdler's 18,500 year old date for human occupation of Cave Bay Cave on Hunter Island, Bass Strait, it may reasonably be stated that the almost 200 year old problem of how the Tasmanian Aborigines got to their island has finally been solved. They walked across Bass Plain when it was exposed by the glacial low sea levels. Bowdler's project involves analysing the changing economic responses of the prehistoric inhabitants of what is now Hunter Island as it slowly became transformed from being a hill in the Bassian Plain to an island off shore from north west Tasmania.

A similar project is being started on Kangaroo Island, S.A. by Lampert. At the Seton Site, Lampert has isolated a stone industry dated to about 16,000 years ago, and which is different to the well known Kartan industry found in surface collections on the island. The implications are that the Kartan may be very much older than this date, and Lampert hopes to investigate the antiquity and cultural milieau of the enigmatic Kartan in a project starting in 1975. Faunal evidence at the Seton Site showed man to be contemporary with an extinct kangaroo-like animal *Sthenurus*, one of the few convincing demonstrations of such direct association yet to be gained in Australia.

In the highland country of southern Queensland, J. Beaton has begun a regional project involving basic archaeological exploration of a vast and remote area. He has spent seven months on a field reconnaissance, and after inspecting archaeological sites on the tropical coast of the north-east and the channel country of the south-west, he has focused on the upland ranges of the Great Divide, particularly the Carnarvon and adjacent ranges. Preliminary excavations were carried out on three rockshelters and a large surface collection was made from a fourth. Other sites, e.g. quarry and milling sites were noted. These data will help to develop a picture of the range of prehistoric human activities in the different kinds of habitats provided by the complicated geography of the Great Divide. The first phase of the analysis has begun and the results will help determine the direction and location of further work.

Modern Aboriginal Hunters

Two projects concerning the ecology and geographical knowledge of modern Aboriginal hunters were continued this year. At MacDonnell River Downs, 250 kms north-east of Alice Springs, J. O'Connell spent about 9 months living amongst the Alyawara people. Although they are technically on a cattle station, and draw some of their sustenance from European sources via pensions, wages etc., a substantial part of their diet is still foraged from their country which they are occupying in a traditional manner. O'Connell has been studying their diet, their traditional and modern technology, including the manufacture of stone tools and the location, form and ownership of their camp sites, both contemporary and as remembered from a period before the advent of white men to their country some 50 years ago. A special study has been made of kangaroo hunts, involving observer participation, time and motion studies and a comparison of the age/sex profile of the catch against the natural population, as an exemplar of the dynamics of human predation within the Australian biosphere. O'Connell has also begun to investigate the relationship of the totemic geography of the Alyawara to ecological principles as exemplified by the seasonal rhythms of their traditional foraging activities.

Jones returned for a month to live with the Anbara community at the mouth of the Blyth River where he and his co-worker B. Meehan, Department of Prehistory and Anthropology, spent a year during 1972/73. On their second brief visit, they concentrated their attention onto the gathering of shell fish associated with the equinoxal tides and also the general foraging activities during the very end of the dry season which is the period of the year when food is least abundant in that coastal tropical environment. More data was obtained on the 'ethnoecology' of the Anbara - that is the way in which they classify the plants, animals, colours, seasons, landforms etc. of their environment.

N. McArthur and R. Ohtsuka also worked on ecological problems pertaining to hunters during the tenure of their visiting fellowships at the department. McArthur's completed Ph.D. thesis 'Population and prehistory: the late phase on Aneityum' dealt with a semi-sedentary agricultural population, and in order to place this work into a broader perspective, she read widely the literature dealing with demographic aspects of hunting and gathering societies. This work will form the background to a broader study of the role of population change in prehistoric communities.

Ohtsuka analysed some of his material gained during a study of the hunters and gardeners of the Oriomo Plateau, Fly River, Papua carried out over the last year in collaboration with H. Watanabe of Tokyo University. Ohtsuka also translated into English from the original Japanese, some of his previous work on the ecology of these fascinating people, whose economy seems to straddle the Australian and Papuan provinces.

The Roots of horticulture in Papua New Guinea

The major project in this field, and by far the largest ever mounted by our department is J. Golson's massive Wahgi project, investigating ancient drainage systems and other archaeological evidence for horticulture in the swamps of the Kuk tea plantation, in the Wahgi Valley of the New Guinea Highlands. Here, Golson led his team for more than six months during the year, and was joined for various periods by P. Hughes, W. Mumford, W. Ambrose, H. Polach and A. Mortlock. The 1973 departmental report included details of the scope aims and initial discoveries of this project. During the 1974 field season, hypotheses have been tested as to the reasons for the use and then periodic abandonment of the swamp as an area for horticulture. Also a major effort has been made to find the oldest evidence of human occupation and various economic activities in the area. The contributions of Hughes, Polach and Mortlock were directed towards this latter aim. Obviously, the full implications of the discoveries made at this site will only emerge after analysis and publication of the material in the laboratory and study as well as in the field, but already the Wahgi Swamp ranks as a major site in any global assessment as to the origins and evolution of the economic system we call 'agriculture'.

The trading networks of coastal and island Melanesia

This also has been a recurrent theme in our department's work over the past five years, with completed doctoral theses by B. Egloff, P. Lauer, J. Specht and R. Vanderwal, and staff work by J. Allen, Ambrose, L. Groube, C. Key and Lampert.

During the first six months of the year, Allen was at Cambridge, England, studying the fieldnotes and unpublished notes and letters of A.C. Haddon, insofar as they related to Haddon's ethnographic studies of the Papuan coast at the beginning of this century. As well, several months were spent doing a thorough survey of Papuan material held in the Museum of Archaeology and Ethnology, Department of Archaeology, Cambridge, of which there are vast and important holdings, both artefactual and photographic. Since returning from England the remainder of the year was spent analysing the excavated material from Motupore Island, Papua which Allen had excavated in 1972 and 1973. A monograph on this site and its implications towards an understanding of the history of trading systems on the south Papuan coast is in preparation.

G. Irwin spent the year analysing materials recovered from the Mailu area of south-east coastal Papua during 1972 and 1973. His pottery study has established a relative chronology of the 120 sites which he found. Irwin also carried out a programme of materials analysis of the prehistoric pottery and associated clay sources, using optical mineralogical and trace element X-ray fluorescent methods and set up a suite of computer programmes. A spatial study of prehistoric settlement patterns, combined with ethnographic data on the contemporary manufacturing and trading situation has thrown light on the emergence of functional site specialisation, and the identification of prehistoric communications systems.

Ambrose also worked on trace element analyses, collecting samples of high quality obsidian from all presently known geological sources in the Papua New Guinea area. The object of this was to provide source samples for two purposes.

1. To enable laboratory determination of the hydration rates of various sources and allow the more precise ageing of obsidian artefacts.
2. To provide samples for trace element analysis. This is in connection with a programme, being undertaken in cooperation with the Australian Atomic Energy Commission, for the non-destructive neutron activation analysis of obsidian artefacts in order to determine their sources and distribution as an indication of prehistoric transport or trade.

The opportunity was taken to conduct a brief field survey of islands off the east coast of New Ireland in the company of a geological survey party from Rabaul. Traces of pottery and obsidian were present on all the islands visited though no surface indications of substantial or extensive sites were located.

G. Ward spent most of the year doing fieldwork in the Banks Group, Northern New Hebrides and Efate Island central New Hebrides. At Mele, on Efate, he excavated a rock shelter containing several burials and pottery decorated in the incised and applied relief tradition. In the Banks Group he continued investigation of the prehistory of the northern part of the New Hebridean archipelago with an intensive survey of a habitation mound complex on Pakea Island followed by excavation of selected mounds. Also an intensive investigation of archaeological sites on other islands in the northern group was aimed at delineation of resource utilisation and dating the origin of the monumental architecture of the area.

Measuring time

Several departmental projects were aimed at fundamental research in developing new methods of absolute and relative dating as well as producing routine dates on samples submitted by field workers both within and without this University. The focus of this research is carried out in the University's Radiocarbon Laboratory under the leadership of Polach. A separate statement on the activities of this laboratory, written by Polach is included with this report.

Much of Ambrose's obsidian work deals with working out methods of dating artefacts made from this material, based on measurements of hydration rim thicknesses as mentioned above.

Mortlock, who operates the Thermoluminescence Laboratory in the Department of Physics in the School of General Studies spent four months in our department in order to familiarise himself with archaeologists and their work, with a view to establishing new

co-operative research projects. Five new studies were initiated, four of them relating to dating problems with new materials, including marine shells, burnt cherts from coastal South Australia, and quartzite from Hunter Island. One project involved measurements of the surface hardness of ancient pottery from Papua New Guinea with a view to establishing a new parameter characterising these artefacts. Mortlock gave a seminar describing the use of thermoluminescence dating and made a visit to the Wahgi field site. The thermoluminescence dating of volcanic ash layers from this site showed general consistence with C^{14} measurements carried out on other stratigraphic material. The systematic difference between the two sets of dates gave the exciting promise of extending the well-known bristle-cone-pine corrections to C^{14} years back much further into the past than previously thought possible. This is because thermoluminescence dating is an absolute method, and little affected by cosmic rays.

K. Conover, undertook an examination of archaeological molluscs (food remains in this instance) to determine if season of collection can be detected. The study is meeting with the expected success, and, in addition, it appears that certain paleoenvironmental data pertaining to the prehistoric littoral can also be extracted from the shell study. The chosen archaeological shell comes from middens near the present coastline in the lower southeast of South Australia. Radiocarbon dates made under another departmental project (Luebbers) place one of the subject shell deposits at ca. 3800 BP, and others are suggested to be of similar age. The habitat for the study species, *Plebidonax deltoides*, no longer exists in the research area. Its nearest present location is the northern Coorong, some hundred and fifty kms up the coast toward Adelaide. Goolwa Beach provided a modern comparative sample of *Plebidonax* from this area. An immediately useful result of the study has been the realisation that it is occasionally possible to determine in the field, without recourse to microscopic examinations whether or not shells in a particular deposit were collected from the same beach at the same time. This is consistently true with the archaeological *Plebidonax*, and has been observed in limited samples of the smaller clam *Donacilla* (= *Amphidesma*) and in the common limpet *Cellana*, all in archaeological contexts.

Measuring bones

The department's osteology laboratory gave advice concerning the faunal component of many of the sites excavated by departmental members. Hope spent most of the year working on fauna from Lampert's Seton Site, Kangaroo Island, the marsupial bones of which were analysed by L. Edmondson for a B.A. Honours thesis in the Department of Geography, Monash University. Hope carried out field work on fossil marsupial deposits in Kangaroo Island and handled faunal collections in the South Australian Museum and at the National Museum of Victoria. She is engaged in a long term project concerning the biogeography, evolution and mega-faunal extinctions of the late Pleistocene Australian fauna, including that of New Guinea.

Thorne, having submitted his Ph.D. thesis to the University of Sydney on his Kow Swamp and Lake Mungo human material, spent the year tidying up odd ends and thinking further about the implications of the Australian hominid material to the broader question of the emergence of modern *sapiens* man. He visited new sites in western New South Wales, and continued working with A. Carstairs on a bibliography of Australian Aboriginal palaeopathology. The West Point Tasmanian cremated human material, originally excavated in 1965 by Jones, and analysed in 1967 by Thorne, was sent to its final resting place in the Tasmanian Museum and Art Gallery, having been photographed and catalogued by Markovic and Carstairs.

Rhys Jones
(with help from
departmental members)

ANU RADIOCARBON DATING LABORATORY

GENERAL PROJECTS

The laboratory is playing an important role in a number of research projects. Indeed, there is a continuing and increasing need for laboratory generated research involving improvements in dating techniques, analysis, interpretation and reporting of results; parameters fundamental to the validity of dating such as environmental contamination and selection of applicable dating standards. Equally important is participation on a cooperative basis in research generated by other departments and institutions, often involving field work.

Low-level Liquid Scintillation Counting Parameters (H.A. Polach, G.E. Calf, I. Fraser, J.D. Gower)

Commercially available liquid scintillation counting equipment is capable of establishing natural C^{14} concentrations within the age range of ca. 1000 to 25,000 years before present (BP). We have shown that significant improvements are possible if modification to equipment are carried out involving operations at reduced high voltage associated with masking of the photomultiplier tubes, and careful selection of other operating parameters such as gain and % efficiency settings.

Improved glass counting vial design (to reduce background) and sample carbon to benzene (the liquid scintillation counting medium) synthesis together with better purification procedures have in our case led to increased precision of C^{14} activity