New Guinea Stone Age Trade examines patterns of trade and exchange for social, ritual and economic purposes within the interior of Papua New Guinea. While inland trade is less well known than some of the Melanesian maritime trading systems it is no less complex or absorbing, particularly when it is recalled that much of the region examined in this work was undiscovered by white men until the mid-1930s. Dr Hughes seeks to separate out traditional trading patterns, to determine the effects of the arrival of exotic goods into the region before whites, and indirectly to gauge the disruption of traditional trading practices by the white presence. Dr Hughes is first and foremost a human geographer but in this work his research has led him into the realms of anthropology, archaeology, linguistics, oral history and material culture, to mention but a few of the areas in which he has pursued his subject. The wealth of data he has accumulated and the conclusions he has reached will ensure that this book remains a fundamental contribution to the subject of traditional New Guinea trade.

This volume contains some 260 pages and includes 17 tables, 37 figures, 17 plates and 7 maps.

Its price in Australian currency is $A7.00 (postage included).

NOTE: Payment must be made in advance to:

Terra Australis
Department of Prehistory
Research School of Pacific Studies
The Australian National University
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RESEARCH REPORT BY THE DEPARTMENT OF PREHISTORY,
RESEARCH SCHOOL OF PACIFIC STUDIES, 1976

Introductory

The major themes of departmental research into the prehistory of Australia, New Guinea and the nearer Pacific Islands have been established now for some years. They have been chosen because they are seen as decisive for the personality of the region in prehistory and look to take advantage of the unique opportunities it offers for archaeological research. The region itself forms a distinctive part of a wider Indo-Pacific province, the nature of whose place in the early history of man is only now coming to be appreciated. Initial colonisation, effected over 40,000 years ago by sea from tropical regions north and west and made in
conditions of climate, environment and geography different from the present, opened up the vast new diversified continent of Greater Australia - Australia plus Tasmania plus New Guinea - to human settlement. Subsequent colonists from the same regions brought domesticated plants and animals into New Guinea and in the more recent past participated in the great maritime expansion, based on highly efficient sea-going vessels and navigational techniques, that led to the settlement of the Pacific Islands and the organisation of wide-ranging systems of trade and economic exploitation between them.

Questions arising from such situations which are the subject of established projects by staff and scholars of the Department include the human palaeontology and archaeology of Australia's earliest inhabitants; changes in the physical anthropological, archaeological and faunal record consequent on the one hand on changes in climate and environment from late Pleistocene into modern times, on the other on human adaptations to and alterations of environments previously unaffected by man; the effects on human populations of the 'islanding' by rising sea levels of territories previously parts of landmasses; the history of human populations on small, truly oceanic islands discovered and settled by sea-going societies bringing new plants and animals; the origins and development of plant-based subsistence systems in New Guinea, in the highlands and, more recently, in the lowlands; the history of specialised trading systems in Melanesia and their more precise definition by both accurate sourcing of the raw materials, and technological study of the manufactured products, involved in the processes of exchange.

More accurate and widely applicable chronologies to underpin the historical aspects of such work are sought by departmental research into obsidian dating and cooperative work with the radiocarbon dating laboratory. In addition because traditional ways of life of the indigenous inhabitants of our research area were alive everywhere until relatively recently and in some form in some areas are alive still, often in environments unaffected by Western man, there exists a great deal of non-archaeological data to extend and control the direction and conclusions of archaeological research. All our projects aim to make use of historical and ethnographic sources and, where possible, of direct observations in the field. Some projects have been specifically set up to record the behavioural patterns that determine the nature and distribution of archaeological evidence in and on the ground, not only as a basis for better controlled investigations in the areas of research but also as contributions to the methodology of the discipline as a whole.
Research Programme

Man-land relationships in southeast Australian prehistory

1. Coasts and islands

Two major pieces of research, by S. Bowdler and R. Luebbers, are nearing completion, a third, by R. Lampert, is well advanced.

Bowdler's PhD work on the archaeology of the Bass Strait islands has concentrated on the Hunter Group off the northwestern tip of Tasmania. Here excavations have established a 23,000 year sequence from the time when Hunter was a collection of hills in the Bassian plain connecting Tasmania to the present mainland; spanning the post-glacial rise of sea level which created the island group and led to its temporary abandonment by man; and recording the subsequent and specialised reincorporation of the area into the subsistence system of human groups on the nearby Tasmanian coast using watercraft. She has this year been completing the analysis of her archaeological data and attempting their integration with the results of geomorphological and palynological investigations to arrive at a fuller view of man-environment relationships in the area. P. Hughes has advised on geomorphological interpretations and G. Hope (Department of Biogeography and Geomorphology, Research School of Pacific Studies) is involved in the palynological work. Highly relevant to the interpretation of her major site, Cave Bay Cave, is the respective responsibility of man and other predators for the faunal remains found there. Hence her co-sponsorship of the November workshop on bone interpretation and her visit to Western Australia to see the site and the excavated evidence of Devil's Lair, which has much in common with Cave Bay Cave.

Lampert's research on Kangaroo Island, South Australia, also deals with an area whose occupation began in the late Pleistocene when it was a southern extension of the continent. At European discovery the island was uninhabited and Lampert's work has confirmed the absence of post-Pleistocene tool types well known on the adjacent mainland. On the other hand he has shown that human groups survived on the island to 5000 years ago and possibly later, though apparently in small numbers to judge by the farness of late sites. Excavations at four open camp sites and controlled surface collecting at others have provided material that will allow characterisation of the original Kartan industry of Kangaroo Island, its change over time until its disappearance, and its relationship to the Pleistocene industries of the Australian mainland. Preliminary survey in mainland regions closest to Kangaroo Island has established the presence of Kartan sites there, but apparently in smaller numbers. These distributional aspects are to be the subject of further work.

Luebber's doctoral research, in coastal districts of SE South Australia, covers a shorter time span, the 5-6000 years since the sea reached its present levels along this shallowly shelving stretch of coastline. The analysis of his field data
is now almost complete. The most conspicuous of these are shell midden heaps, often discrete, whose changing species composition allows the temporal ordering of the data. Luebbers defines three main phases, the first two of which are characterised by only intermittent use of littoral resources. At this time the focal points of subsistence activities were the extensive freshwater swamps impounded between and behind the long dune belts of the region. In the third phase the focus shifted westwards towards the coast and more intensive use of littoral resources is indicated. The main evidence for these interpretations is provided by very detailed analysis of the shell midden data - their number, size, associated artifacts and features and, using techniques developed during her post-doctoral work by K. Conover, the indications from the growth patterns of the major shell types for the contemporaneity or otherwise of collection of shells in the same and different heaps. Luebbers attributes the changed pattern of settlement and resource exploitation in phase 3 to changes in the ecology of the swamps, drawing on the work of J. Dodson who did palynological investigations in the region as a scholar in the Department of Biogeography and Geomorphology, Research School of Pacific Studies.

2. Inland

J. Beaton's doctoral research into the prehistory of the upland region (300-1200 m) of south-central Queensland is approaching completion. The evidence points to sustained Aboriginal exploitation only within the last 5000 years. His analysis of the excavated evidence from Cathedral Cave, in the Carnarvon Gorge, has strengthened his previous conclusions as to the periodic and specialised use of rock-shelter sites in the highly dissected tract of elevated land where his research has been concentrated. His work continues to indicate the importance of the seeds of the cycad Macrozamia moorei among the resources which explain man's presence in the area. The poisonous nature of these seeds has led Beaton to investigate variability on the one hand in the poison in different species of cycad and on the other in the poisonous residue in cycad meal after preparation techniques of cycad seeds used by Aborigines have been simulated. These considerations are of general significance considering the importance of cycads in the subsistence systems of many, especially tropical, Aboriginal groups, as well as to various farming communities in mainland and island Southeast Asia.

I. Johnson began doctoral research on the stone tool industries of eastern New South Wales, with particular reference to the appearance and disappearance of the so-called small tool tradition of backed points and geometric microliths. This region, centring on Sydney and including the university centres of Armidale (University of New England) and Canberra (Australian National University), contains the greatest number of excavated archaeological sites in Australia, as well as being represented by large surface collections in various museum and private holdings.
Ethnographic Approaches

J. O'Connell began comprehensive analysis of ethnographic data on contemporary Aboriginal campsite behaviour collected amongst the Alyawara of MacDonald Downs Station NE of Alice Springs over a period of 13 months between April 1973 and March 1975. Information from bi-weekly census records, household plans and site maps was organised in a general model of settlement structure and dynamics at an intra-site level. The aim was to develop a series of predictive statements about the spatial organisation and content of archaeological assemblages expectable at recently occupied Alyawara campsites. The following results have emerged from the analyses:

a) the ground plans of all Alyawara household camps conform to a similar pattern, but vary in terms of the size, number, and spatial arrangement of internal features, including main shelters, shades, hearths, activity areas, etc. The arrangement of major features was shown to vary seasonally as a function of shifts in the direction of prevailing winds. Floor area of both main shelters and activity areas was shown to vary with household population and with the length of time the camp was occupied. Since these features are likely to be recognisable in archaeological context, it should be possible to determine the season in which household camps were inhabited and to estimate size of household unit and/or span of occupation at prehistoric sites;

b) the total area of Alyawara settlements was shown to vary with the numbers of people or numbers of households and with span of site occupation. However, because of the difficulty of independently controlling the latter dimension in archaeological context, it seems unlikely that site population can be estimated in prehistoric situations, except at a very general level.

The next step is to test the ethnographic predictions against archaeological remains. Preliminary work has been done to this end by coding material from a small abandoned Alyawara camp occupied within the last few years and after testing, expanding the code to handle the larger, more diverse sample of material from a second similar site. E. Hawke made an important contribution to this work, which has involved the processing of over 10,000 items.

During a brief archaeological reconnaissance when investigating Alyawara land claims at the request of the Australian Institute of Aboriginal Studies, O'Connell located at least one site with promise for applying the results of the above exercises to the spatial patterning of materials at camps of late prehistoric age.
Plant-based subsistence systems in New Guinea

1. The origins and development of agriculture in the New Guinea highlands

J. Golson and P. Hughes spent a further 2 months season at the Kuk swamp at 1600 m near Mount Hagen. Two main questions were addressed:

a) the natural or artificial status of a 9000 year old channel running across the site in a manner roughly comparable to that of 6000 year old and later water-disposal channels made by man; and the nature of features close to the channel on the same old land surface. Both the channel and the features are filled and sealed by a fan-like deposit of grey clay which has been with increasing confidence interpreted as the product of increased soil erosion in the catchment of the swamp brought about by the clearance of bush for cultivation. The small sample of underlying features investigated last year was then interpreted as due to the wallowing of pigs in wet ground, the bones of this non-New Guinea animal having recently been reported from 10,000 year old levels in two highlands rockshelters. As a result Golson looked upon the channel as a natural stream course, to which pigs had recourse in the heat of the day, which was rendered extinct through infilling by the erosional products of agricultural operations. Further work on this channel by Hughes confirmed his contrary opinion that the channel was man-made, while enlarged excavations by Golson adjacent to it revealed a vastly extended suite of contemporary features, including stake holes, pits and gutters, that look to belong to plant husbandry instead of or in addition to pig husbandry.

b) the organisation of the swamp management system immediately on top of the grey clay and dating from 6000 to 5500 years ago. This had been investigated in a preliminary fashion in one locality last year, where it was seen to articulate with one of a number of large disposal channels, roughly contemporary but not necessarily operating simultaneously. The digging of these accounts for the end of grey clay deposition in the swamp, since they allowed that clay to be flushed through the system and out of it. This year two other areas relating to this phase were investigated. One revealed a sophisticated arrangement of basins and linking gutters, so arranged as to retain water in the basins up to a certain level and allow its removal along the chain to the nearest disposal channel when that level was exceeded. The arrangement appears to be highly suited to the cultivation of a water-favouring plant like taro, with less water-tolerant plants (e.g. yam, banana) grown on the small clay islands.
between the basins. The second area, adjacent, produced evidence of a different kind but contemporary date, with the rather disorganised occurrence of a number of repeated features, bearing a strong resemblance in type and lack of pattern to the 9000 year old features below grey clay. The evidence seems to argue the persistence of old cultivation practice and the development or acceptance of new, but whether as a response to the introduction of new plants is not known.

L. Lucking worked as research assistant to the project, dealing with the identification of botanical remains found during excavation.

2. The history of sago exploitation in the New Guinea lowlands

J. Rhoads completed the field reconnaissance for his doctoral research in the first part of the year and in September returned to his chosen field location upriver from Kikori on the Gulf of Papua for his major field season. His project, which is taking place in very difficult conditions of swamp and jungle, involves closely linked ethnographic and archaeological enquiry. He has established the traditional settlement pattern as one of nuclear villages from which curated stands of sago are directly worked and close to which small gardens of other food plants are maintained; with outlying sago stands whose exploitation requires temporary residence away from the village, at which period the men are active in local hunting and fishing. In limestone outcrops he has located shelters which may represent prehistoric examples of such temporary camps, since they are close to sago swamps and their deposits rich in appropriate fauna. He has also discovered a prehistoric village site on the main river. This and some of the shelters contain imported pottery which can be dated to about 1000 years ago by reference to the ceramic sequence developed by a former scholar of the department, R. Vanderwal, at the Oposisi site on Yule Island (Kairuku) some 250 km SE down the Papuan coast. These discoveries may reflect the antiquity of trading links involving central Papuan pottery and Gulf of Papua sago, such as were flourishing into the European period in the region and have been a major focus for J. Allen's work in the Port Moresby area.

Trace and settlement in coastal and island Melanesia

1. South Papuan trading systems

Helped by B. Sadler, J. Allen continued the analysis of the excavated material from Motupore, the crucial site for the study of the development of Motuan trading systems.

Work on the abundant ceramic remains was done in close collaboration with O. Rye. Motupore has been assumed to be a manufacturing site only because of the quantity of sherds in middens on the island. Samples were made from all potential clay and sand sources in the area, from Taurama Point to Tupesereia along the coastline; at the same time surface
collections from the area held in the Department of Anthropology and Sociology, University of Papua New Guinea, Port Moresby, were sampled, and surface collections made from several new sites discovered during the clay sampling work. Experimental work with these materials has had two aims: firstly to study the ceramic behaviour of clay/sand mixes at various temperatures in order to isolate the 'best' materials, i.e. those having the widest usable range of combinations; and secondly, in conjunction with Dr M. Worthing of the Geology Department, UPNG, to establish which materials were actually used for the pottery found on Motupore and in surrounding areas. Preliminary results suggest that the best clays are located very close to Motupore Island, and the sand on the island itself, and that these materials were used to make much of the pottery found on the island and in nearby sites.

X-ray studies of Motupore sherds, aimed at reconstructing manufacturing techniques, show that one major class of vessel, the globular pot, was formed by consistent techniques right through the period of occupation of the site. Open vessels, dishes and bowls, show greater diversity of forming techniques; some of those with distinct stylistic characteristics probably originated elsewhere, and the results of materials studies when available will clarify this. Firing temperatures are also being studied for selected sherds, using dilatometer techniques, in conjunction with the Ceramics Section of the Division of Building Research, Commonwealth Scientific and Industrial Research Organisation, Melbourne. These studies will ultimately provide a technological classification of the pottery to provide more information than a purely stylistic typology can.

G. Irwin, now a lecturer in the Department of Anthropology, University of Auckland, completed the writing up of his PhD research on the emergence of Mailu Island as the focus of trading systems in SE Papua.

2. Obsidian trade and obsidian dating

Aided by a further grant from the Australian Institute of Nuclear Science and Engineering, W. Ambrose continued cooperative work with Dr R. Bird of the Atomic Energy Commission at Lucas Heights, Sydney. With the New Guinea obsidian sources in the Admiralty Islands, on Fergusson Island in the D'Entrecasteaux, and in New Britain now chemically characterised, Ambrose has embarked on the attribution to source of several hundred specimens of obsidian from archaeological sites in the SW Pacific, by the technique of prompt nuclear analysis.

In addition Ambrose has instituted a cooperative programme of experimental work with Dr C. Newton of the Department of Nuclear Physics, Research School of Physical Sciences, aimed at the precise delineation of the hydration profile and water content of hydrated obsidian, using a technique of $^{19}$F bombardment. This research is related to Ambrose's continuing concern to establish the independence from other dating methods.
of dating by obsidian hydration. Further work is planned to establish the hydration velocity of all the known Papua New Guinea obsidian sources and to relate the process to the temperature regime of individual geographical locations. Some progress has already been made in determining the intrinsic hydration rate of one of the major sources at Talasea.

While in the United States for the Wood Conservation Conference organised by Washington State University, Ambrose took the opportunity to visit one of the pioneers of obsidian dating, Dr I. Friedman, US Geological Survey, Denver, and accompanied him on a field trip to obsidian sources in Yellowstone National Park.

3. Banks Islands, New Hebrides

G. Ward's doctoral research is concerned with the settlement and subsistence economy of this small group of volcanic and coral islands at the northern end of the New Hebrides, immediately beyond the major biogeographic break south of the Solomons that marks the beginning of Oceania proper. His major field season was completed in 1975 and this year he has concentrated on the analysis of his excavations. The most important of these were made at a mound complex on Pakea, a low coralline islet off the coast of the volcanic island of Vanua Lava. The lower levels mark the occupation of an old lagoonal shoreline some 3000 years ago: imported stone tools and pottery are associated with the remains of reef and lagoon resources exploited both for food and raw materials for manufacturing tools and ornaments. The upper levels indicate continued exploitation of littoral resources, accompanied by significant build-up of the island itself by mounding of shell midden, more permanent settlement and greater utilisation of raw materials from within the Banks group including basalt and obsidian, probably obtained by exchange for reef products. Pottery ceases to be traded in at this time.

Stone-built ceremonial centres associated historically with a complex hierarchy of men's clubs and with centres of permanent settlement appear to be of relatively recent origin: charcoal from excavated hearths at some of these has been dated to within the last five centuries and many others appear to have been built after European contact.

Studies of Bones

1. Man

A. Thorne worked during the year on the preparation of a monograph giving a detailed description and analysis of the human osteological remains from Kow Swamp and Lake Mungo, which have come to light in the course of systematic fieldwork in the Riverina area of N. Victoria and S. New South Wales over recent years, and reviewing all earlier, less well controlled, discoveries. New sites are regularly being reported in the Riverina and Thorne
made a field survey of such sites. He also began an analysis of human post-cranial collections in the Institute of Anatomy, Canberra; these collections are particularly rich in specimens from the Riverina region. The total body of data, when analysed, will allow some well founded statements to be made about the status of early man in Australia and the nature of his physical evolution in one part of the continent.

2. Dog

K. Gollan began his doctoral research on the dog in Australia and the Pacific. This is in many ways a pioneering study and will bring together widely scattered materials never before systematically reviewed and compared. Even local studies of dogs within the region are few. Gollan's first task has therefore been to establish a metrical and non-metrical data base for Australian dogs, both dingoes and domesticates, and for this purpose he has had access to central Australian collections made by Alan Newsome (Division of Wildlife Research, Commonwealth Scientific and Industrial Research Organisation, Canberra). These data have been analysed to provide a reduced set of observations to be made on other specimens. Gollan has tested photographic techniques for the measurement of skulls. These will provide a limited number of significant variables not obtainable by other methods.

Gollan has now started on the location and recording of dingo material from New South Wales, Victoria, South Australia and Western Australia. During his visit to Perth he took part in a WA Museum field trip to SW Western Australia to collect dingo specimens preserved in caves. During the same period he has begun the preparation of Pacific dog material: New Guinea dogs from Taronga Park Zoo, Sydney, and archaeological specimens from the Society Islands and the Marquesas provided by Dr Y. Sinoto of the Bernice P. Bishop Museum, Honolulu, Hawaii.

3. Fauna

In continuance of her long term project to assemble data relating to palaeontological sites and collections in SE Australia, J. Hope made short trips to sites at Buchan, Wellington, Wombeyan and Abercrombie and did further work on the important collections of the late N.A. Wakefield in the National Museum of Victoria, Melbourne. She completed work on faunal collections from Irian Jaya and from Lampert's Seton site on Kangaroo Island.

In the Osteology Laboratory the faunal reference collections were completely revised and updated, with the help of A. Garnett and K. Conover. There are now extensive collections of mammals and molluscs and smaller collections of fish, reptiles and birds. Hope made arrangements in support of a fish collecting project to be carried out by G. Barnett, late of the Department of Anthropology, University of Auckland, in the Western Pacific, by which the departmental collections will be augmented.
Other Activities

J. Allen completed the editing of volume 3 in the departmental series Terra Australis, which is a revised version of a PhD thesis on traditional trade in the New Guinea highlands written in the Department of Human Geography, Research School of Pacific Studies, by I. Hughes now of the ANU's Human Sciences Program, School of General Studies. Allen also continued with the editing of the Sweatman journal and, with Golson and Jones, undertook the preparation for publication of the papers from the Sunda and Sahul symposium organised by the Department for the 13th Pacific Science Congress in Vancouver last year.

J. Golson

(Adapted from the department's 1976 annual report.)

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RECENT ARCHAEOLOGICAL RESEARCH IN WESTERN AUSTRALIA

General Investigations

1. Devil's Lair

Dortch and Merrilees have continued their Devil's Lair investigations with a sixth field season in April 1976 during which they recovered bone and stone artefacts from layers well below that now dated in excess of 31,000 years ago (personal communication, C. Dortch). The stone material was mainly limestone, but included two quartz pieces. These lower layers differed from those encountered higher in the deposit in that they no longer represented undisturbed occupation levels, but appeared to have a component of secondarily derived material. It is not yet possible to make unequivocal statements about the faunal associations of this cultural material.

The human hip bone with a date of about 12,000 BP recovered in 1975 (Dortch 1975) has now been described by Allbrook (1976) as comprising the major part of the right half of the pelvis of a mature, probably male, individual. Its recovery from a hearth near the side of the cave raises questions of its role in the activities in a site which has yielded also a perplexing narrow pit, barely wide enough to hold a man (Dortch and Merrilees 1973), and two detached central incisors (Davies 1968; Davies 1973). Freedman (1976) points out that the finding of a third incisor, this time an upper lateral deciduous incisor from an individual probably only about eight years old, would throw doubt on the possible interpretation of this material as denoting initiation rituals.