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SALTWATER PEOPLE, SALTWATER COUNTRY: GEOMORPHOLOGICAL, ANTHROPOLOGICAL AND ARCHAEOLOGICAL INVESTIGATIONS OF THE COASTAL LANDS IN THE SOUTHERN GULF COUNTRY OF QUEENSLAND

RICHARD P. ROBINS, ERROL C. STOCK AND DAVID S. TRIGGER

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This paper describes the results of an exploratory geomorphological, anthropological and archaeological research project carried out in coastal lands of the southern Gulf of Carpentaria between 1982 and 1988. This is an area for which there is limited information about Aboriginal use of the landscape. The paper describes the pattern of coastal land formation and reports on preliminary investigations relating to chenier development. Anthropological data depict key features of historic Ganggalida traditional Aboriginal land use and occupation. The traditional system of land tenure is described and key sites are identified to enable comparisons to be made with the archaeological record. The distinctiveness of the coastal area in a regional Aboriginal perspective is established. The characteristics of the archaeological evidence are described for twelve selected areas, and comparisons with the historic record and contemporary Aboriginal knowledge are made. The archaeological evidence includes shell scatters, mounded shell middens, wells and fishtraps. Dates obtained from three sites range from 1,300BP to 140BP. Geoarchaeological data provide a chronological framework for the understanding of indigenous land use over a period of 2,000 years, and point to similarities with archaeological evidence on Cape York Peninsula and other areas in northern Australia. □ *Ganggalida country, chenier development, shell mounds, Queensland, archaeology, anthropology, geomorphology, Gulf of Carpentaria.*

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This paper presents the results of geomorphological, anthropological and archaeological investigations undertaken between 1983 and 1988 in the southern Gulf of Carpentaria, Queensland. The study area extends from Point Parker (17°01'S, 139°09'E) westward to Eight-Mile Creek (16°47'S, 138°32'E) (Fig. 1).

The aim of the research was to characterise the archaeological evidence of Aboriginal occupation of the southern Gulf of Carpentaria, and to place it within a social and environmental context. The research reported here is part of a larger project that sought to identify and explain the cultural history of the area and to account for cultural differences amongst the Aboriginal inhabitants of the Wellesley Islands and adjacent coastline of the southern Gulf. The agenda for this debate had been set by Norman Tindale who, following Roth (1903: 2), argued that the Kaiadilt of Bentinck Island have been culturally isolated from the mainland since at least the last post-glacial marine transgression created Bentinck Island approxi-

mately 6,000 years ago (Tindale, 1962a, 1962b, 1977, 1981).

There is a general dearth of information about both the environmental and cultural landscape of the southern Gulf. Prior to this fieldwork, geomorphological reconstructions were based only on limited fieldwork, aerial photo interpretation and extrapolation from other coastal areas, particularly to the east (e.g. Rhodes, 1978, 1980; Smart, 1976a, 1976b; Smart, et al. 1980). Stock commenced the geomorphological studies in 1987. The initial aims were to develop a land system classification for the coastal areas; to undertake a preliminary geomorphological description of the coastal sediments to develop depositional models; and, to establish broad time-limits for some sedimentary units.

Despite a long history of anthropological work in the southern Gulf of Carpentaria (e.g. Roth, 1903; Tindale, 1962a, 1962b, 1977; Cawte, 1974; Memmott, 1979, 1985) no detailed sociocultural research relating to the Ganggalida of the southern coastal mainland had been undertaken until

Trigger conducted fieldwork in this area variously from 1978 onwards (see, e.g. Trigger, 1987). A linguistic analysis of the Ganggalida language (also known as Yugulda) was published in 1983 (Keen, 1983). Trigger's fieldwork in coastal Ganggalida country was part of broader anthropological research to document sites of significance, traditional systems of land tenure and use of resources by Aboriginal people in parts of northwest Queensland and northeast Northern Territory.

There had also been very little archaeological research conducted in this part of the Gulf or on the North and South Wellesley Islands to complement the anthropological perspective. Of the little work that had been done, all was of a preliminary nature, and consisted of passing references to prominent archaeological features (Boyd, 1896; Trigger, 1987), brief archaeological reports (e.g. Robins, 1982; Memmott & Robins, 1984) and limited surveys coupled with ethnographic research (Roth, 1903; Tindale, 1962a, 1962b). No detailed surveys with a regional focus or excavations (including the dating of archaeological evidence) had been undertaken.

Prior to addressing issues concerning inter-island cultural relationships, basic questions about the history and formation of the southern Gulf of Carpentaria landscape and the relationship between Aboriginal people and that landscape had to be answered. In this context, fundamental inquiries about Aboriginal social and economic use of the landscape, the nature and age of the archaeological evidence, and the history of landscape evolution, had to be undertaken. This involved:

- a) describing the environmental character of the region and its history;
- b) documenting aspects of Aboriginal historical, social and economic life prior to, and at the time of European contact; and,
- c) describing the nature of the archaeological evidence and establishing a chronological framework.

This research thus embraced distinct disciplines: geomorphology, anthropology, and archaeology — with archaeology playing a pivotal role. The research was undertaken in two ways: broad general survey and more detailed investigation of selected areas.

## REGIONAL SETTING

### ENVIRONMENTAL CONDITIONS

The climate of the study area is highly seasonal — characterised by hot, wet summers and cooler,

dry winters. Average rainfall is about 800mm per annum with the bulk of this falling between February and March. Rainfall ceases abruptly in March and little falls until thunderstorm activity commences October-November. Cyclonic conditions can occur from December through March. Temperatures are high with summer maximums between 29-35°C and winter maximums between 15-21°C. The winds in summer are generally from the northwest and in the winter from the southeast (Smart et al., 1980: 3; Rhodes, 1980: 29).

Mean sea level varies with seasonal variations in wind direction and flooding. In the study area there is a fall in mean monthly sea level in winter and a rise in summer. In the southern Gulf, tidal range varies from 1.8m in the winter to 5.5m in the summer (PA Management Consultants, 1973: 177). Tides are predominantly diurnal. Modelling (Easton, 1970; Webb, 1981; Church & Forbes, 1981) shows how the tide enters from the northwest and is propagated clockwise around the Gulf. The diurnal component is enhanced and the semi-diurnal reduced through friction and absence of resonance. Mornington Island is the site of a virtual amphidromic point.

Wave activity due to winds and breezes is significant because of the shallowness of the Gulf. Wave energy is of importance to shoreline stability (Rhodes, 1980: 37) and the production of depositional landforms near the shoreline.

### PHYSIOGRAPHY

The study area, from Point Parker to Eight-Mile Creek, is at the eastern end of the Manangoora Plains Region that extends into the Northern Territory and is part of the Carpentaria Fall Province (Jennings & Mabbutt, 1977). Eastwards from the study area the bulk of the coastal zone is in the Karumba Plains Region. Grimes & Douth (1978: 102) and Grimes (1980: 331) use the term Doomadgee Plain as a rough equivalent to Manangoora Plains.

In general, the littoral plains consist of a number of distinct depositional environments created primarily through the progradation of late Pleistocene and Holocene sediments in and around inliers of Tertiary laterites. From the sea, sub-units of the littoral plain generally follow in order:

- 1) extensive intertidal mudflats supporting seagrass communities;
- 2) shelly/sandy beaches;
- 3) fringing mangroves;
- 4) tidal hypersaline mudflats;
- 5) parallel to sub parallel cheniers or beach ridges supporting *Acacia*, *Eucalyptus* and *Pandanus* woodland;

6) tidal saltflats; and, 7) Pleistocene dunes with open woodland.

Further inland are plains of predominantly Tertiary laterites with sandy soils or calcareous alluvium and soil. They extend southwards for several hundred kilometres to the Isa Highlands. The area is low in elevation (less than 100m), with *Acacia*, *Eucalyptus* and *Melaleuca* open woodland to woodland vegetation. Mature ephemeral streams with deep channels dissect the plain and develop into extensive estuarine systems near the coast. Unlike the coastal regions to the east and west, no major river systems flow through the study area.

## GEOMORPHOLOGY

### GEOLOGY

During the late Pleistocene and Holocene the Gulf of Carpentaria was a region characterised by coastal and estuarine sedimentation. From a geological perspective the sediments are the youngest in a 300m-thick pile of Cainozoic sediments within the Karumba Basin. The Karumba Basin itself is superimposed on the Carpentaria Basin, which had been a down-warping structural unit for most of the Mesozoic. Phipps (1980: 382,385) pointed out that the Gulf of Carpentaria is one of the few modern analogues of an epicontinental sea unaffected by Pleistocene ice, and that sedimentation here represents a marine extension of that on the coastal plains.

The Gulf of Carpentaria has filled and emptied to different degrees in response to eustatic variations throughout the Cainozoic. Torgensen et al. (1985) and Jones & Torgensen (1988) recognised the importance of a sill at about -53m with respect to today's sea level. The sill acted as an important threshold control on the form and depth of Gulf waters. Jones (1986, 1987) and Jones & Torgensen (1988) plotted a late Quaternary geological history, the period of particular interest for human occupation. Over the last 50ka, streams and their associated alluvial fans extended from the south and merged further out with marine and lacustrine deposits. During and since the last post-glacial transgression, prodelta fluvial sediments capped with chenier/beach ridge sediments were deposited under subaerial conditions and in the nearshore zone to -35m.

There is widespread evidence for Tertiary lateritic weathering of Mesozoic rocks around the Gulf, and on the Wellesley Islands and inliers of the study area the laterites are ferruginous. In

palaeogeographic reconstructions (Grimes, 1980: 342) the Wellesley Islands are shown at the northwest end of a positive NW-SE trending structural block linked to the Donors Plateau of today's mainland. In the study area, Bayley Point has an Aurukun Surface (Doutch, 1976) Tertiary laterite inlier of some 2km<sup>2</sup>. At Bayley Point and Point Parker near-shore shelves of laterite have provided rock for fish trap construction.

The manner and timing of the burial of the laterite inliers have a bearing on Aboriginal access to coastal resources, and possibly even on local place names. As small offshore islands and near-shore shelves became incorporated into the mainland they became more accessible for resource exploitation and living space.

### SEDIMENTATION PATTERNS

Phipps (1980: 386) noted a broad area of sand in the southern Wellesley Islands and a large tidal delta between the Wellesley Islands and the mainland. He considered the tidal delta and sandbanks indicative of sand movement from the east. If this interpretation is correct, transport of sands into the study area should be primarily from the east.

Jones (1986, 1987) confirmed two zones of contrasting sedimentation activity: an offshore zone of comparatively low rates and a nearshore active zone. Jones & Torgensen (1988) reported mid-Holocene dates for surficial sediments in the mid parts of the Gulf. Sandy sediments in the nearshore zone accumulate as shallow deltas and sub-aerial chenier/beach ridges; the fine suspended sediments are deposited in waters generally less than 20m deep.

Rhodes (1978) used variations in sand proportions to construct a four-zone, shore-parallel subdivision of modern bottom sediments along the eastern side of the Gulf: 1, inshore sand zone; 2, inshore mud zone; 3, offshore sand zone; and, 4, offshore mud zone. The features of these zones are relevant to the study area because during coastal progradation in the Quaternary, sandy sediments of the inshore sand zone and the cheniers/beach ridges were deposited over muds of the inshore mud zone.

### CHENIER PLAIN DEVELOPMENT

The broad coastal plains in the study area are typical of Quaternary coastal plains across northern Australia. In sedimentological terms they are chenier plains, i.e. relict, beach-ridge plain complexes, formed by the progradation of the coastline. Chenier plains are characterised by: ridges (the cheniers) composed of quartz sand with variable proportions of shelly detritus; and inter-

chenier areas of lower elevation (swales, flats) composed primarily of mud with small proportions of sand and shell.

In parts of the study area many elongate sandy ridges are separated by swales, also of sand and not much mud. These are more correctly beach ridges rather than cheniers and can form distinctive, sandy, ridge-and-swale depositional units up to 600m wide. Some beach ridges along their length (several kilometres) may become progressively surrounded by mud-rich sediments so that they are 'transformed' into cheniers. Under most situations in geoarchaeology it is not necessary to make a formal distinction between cheniers and beach ridges. Unless verified as a chenier through field examination, all ridges described in this report will be referred to as beach ridges.

Numerous elongate lagoons are impounded between the ridges, between ridge-and-swale depositional units, and between these units and lateritic inliers. The direction of littoral transport can commonly be interpreted from the plan-view form of the end of the ridges where they are reminiscent of recurved spits. Many ridge-and-swale depositional units have sharp inland margins that cut across older units and indicate episodes of beach realignment.

Valentin (1961) and Twidale (1966) described details of the ridges and intervening muddy sediments in different areas around the Gulf. In common with the Quaternary ridges on chenier plains in northern Australia they are white to pale brown in colour. They tend to show a progressive reduction in relief and in carbonate content with age (Grimes, 1980; Clarke et al., 1979; Rhodes, 1980). Older Pleistocene ridges commonly contain no calcareous components and have very low profiles. Grimes (1980) recognised two groups of Holocene ridges on the northern Karumba Plain, with the younger set having sharper relief and generally higher elevation than the older group. Whitehouse (1963), Smart (1976a), Rhodes (1980) and Rhodes et al. (1980) showed that almost all the Holocene sandy ridges of the Gulf plains overlie grey green marine silts and clays with variable proportions of shelly clasts and sand.

The formation of chenier plains is a subject of much speculation. Russell & Howe (1935), Russell (1953), Gould & McFarlane (1959), Byrne et al. (1959) and Coleman (1966) studied cheniers along the Louisiana coast and Smart (1976b) Clarke (1979), Rhodes (1980), Chappell & Grindrod (1984), Chappell & Thom (1986) and Lees (1987) at various localities in northern Australia. There appears to be consensus that an important

feature of the environments in which chenier plains develop is a periodic variation in the balance between fluvial and marine forces. Where the marine hydraulic environment is fairly constant, cheniers can be built if the alongshore sediment supply fluctuates. Alternatively, if the sediment supply is relatively steady, an increase in the energy level of the marine hydraulic environment may switch deposition from dominantly mudflat to chenier.

On the chenier plains around the Gulf, Rhodes (1980) and Rhodes et al. (1980) argued that low fluvial supply led to progradation dominated by cheniers and these were separated by progradation dominated by mudflats with abundant muds supplied by rivers. Chappell & Grindrod (1984) suggested carbonate sediment supply was important in the promotion of cheniers in northeastern Princess Charlotte Bay on the east coast of Cape York Peninsula. Muddy conditions reduce shell production in the lower intertidal and subtidal source areas and thus reduce the supply of this coarse, chenier-building component.

Rhodes (1980) acknowledged that wave energy could be an important secondary factor but this was most likely to cause modifications in the geometry of individual ridges. Storm events are known to generate sufficient wave energy to increase the proportion coarser material through the removal of fines at the strandline. However, single storms alone cannot be invoked as the major agent in producing chenier-dominated sequences (Clarke et al., 1979) because they should have produced a larger number of ridges across chenier plains as a whole (Lees & Clements, 1987). A secular increase in storminess, particularly during periods of lower fluvial supply, could generate groups of coalescing cheniers/beach ridges.

#### AGE SEQUENCE OF CHENIERS/ BEACH RIDGES

At the regional level and in the study area it is essential to establish the age of the chenier/beach ridge sequence so that a base date can be set for plant and animal colonisation and for Aboriginal access to coastal food resources, freshwater supplies and camp sites. Recent marine geological and coastal geomorphological studies confirm the general patterns of late Quaternary sea-level change, climate and progradation, even though agreement on the details and mechanisms is not available.

Hiscock & Kershaw (1992: 62) noted fair agreement between the rate and timing of sea-level rise at northern Australian sites. Today's level was

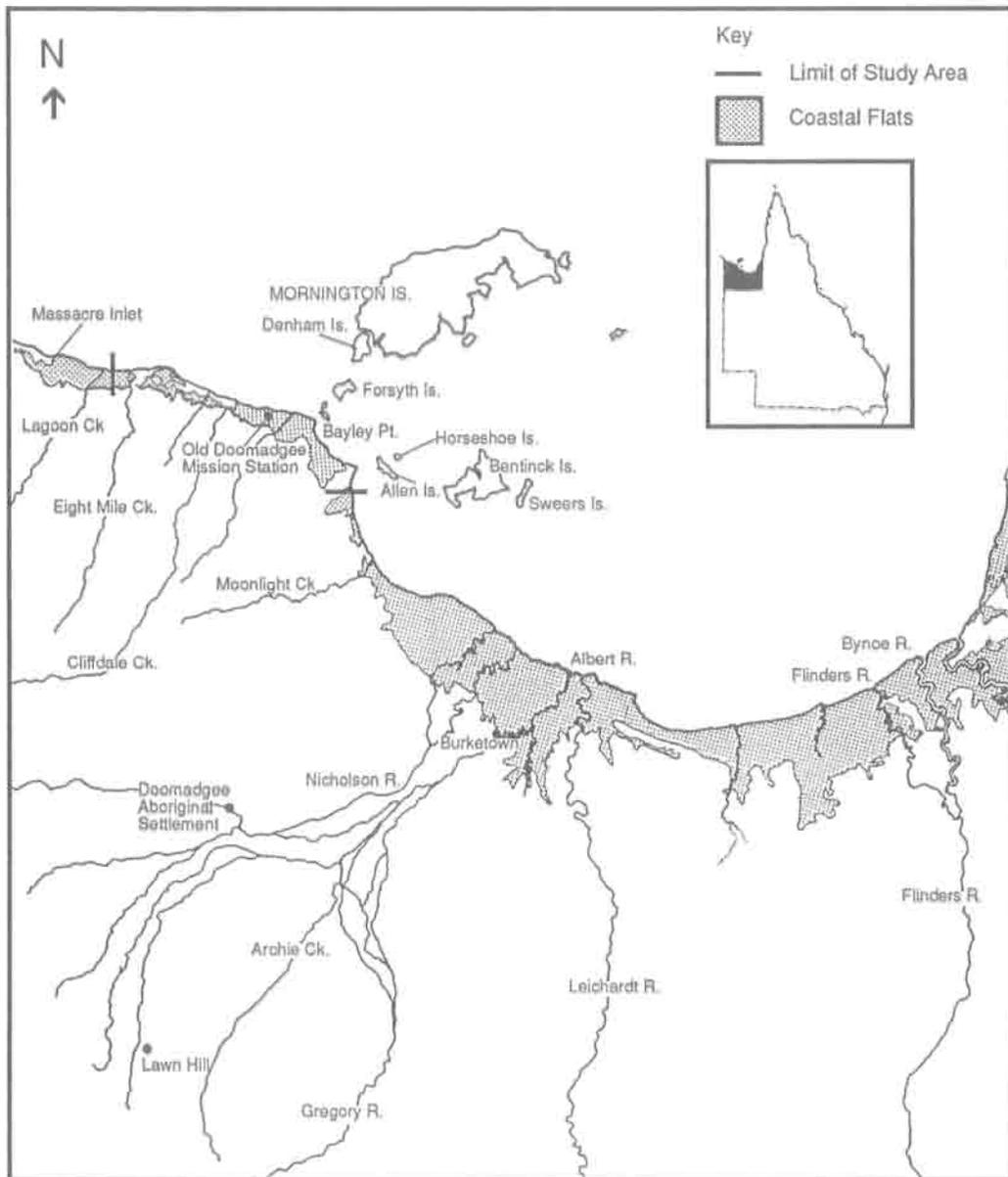


FIG. 1. Location of study area in southern Gulf of Carpentaria.

reached around or slightly before 6,000BP and there may have been a fall of up to 2m at some locations. Jones & Torgensen (1988) examined the marine geological record in the southern Gulf of Carpentaria and, despite their regional approach,

concluded there was no significant uplift or down-warp over the last 5,500 years. Consequently the Late Holocene sequence is primarily one of progradation with little change or only a slight fall in sea level.

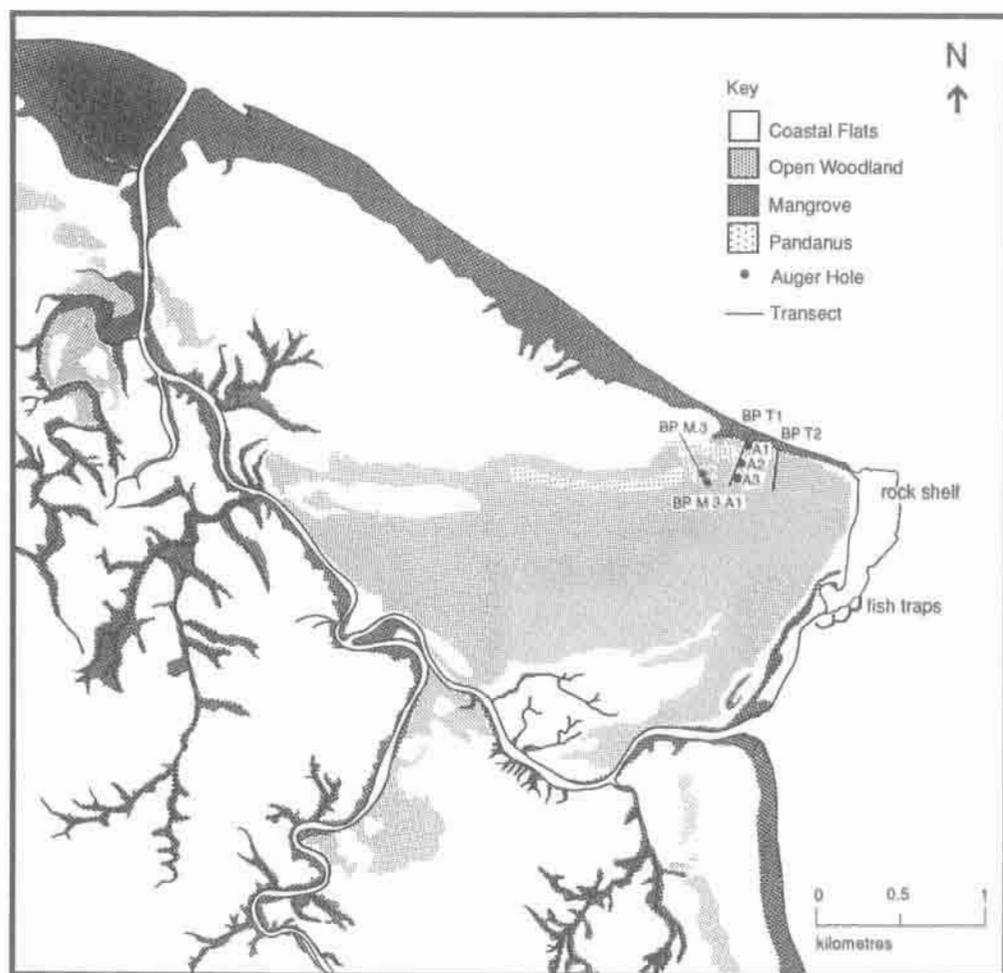


FIG. 2. Plan localities of transects and auger holes at Bayley Point.

Today, older Pleistocene cheniers/beach ridges of the Karumba and Manangoora Plains are subparallel to the present coastline and lie near the inland margin of these physiographic units. They are up to 30km from the coast and 6m above sea level. Simpson (1973) considers these inland ridges mark the limit of the transgression of Quaternary seas. Along the Pandanus Yard transect (Rhodes, 1980), which is nearest (100km) to the eastern end of the study area, the Pleistocene ridges butt onto the upland surface and are little more than 5km inland. Holocene ridges, which developed following the post-glacial transgression, commence about 5km in from the coast.

Smart (1976b) reported a logical sequence (from older inland to younger seawards) of radio-

carbon dates for Holocene ridges on western Cape York Peninsula. He considered the sea reached its present level, or slightly higher, 6,500-7,000 years ago. The style of Holocene ridge deposition, according to Smart, was barrier-island type between 6ka and 4ka, particularly the set mapped as Qhm<sub>2</sub>. This was followed by an increase in sediment supply and rapid progradation of the coast, and with beach ridges developing in two sets. Smart thus differed with other Gulf researchers who linked chenier formation with lower fluvial inputs.

Rhodes (1980) and Rhodes et al. (1980) argued for distinct periods of chenier development in the Holocene: 4,500-2,900BP, 2,000-1,700BP and 1,300BP-present. They linked increased chenier

development with the lack of fine terrigenous material available from fluvial input for mudflat progradation. Coupled with this explanation, Rhodes (1980: 299) postulated the Carpentaria chenier plains experienced a relative sea-level fall of about 2.4m during the last 5,500 radiocarbon years. However, he considers this had relatively little influence on ridge development. On the Pandanus Yard transect, late Holocene ridges were formed between 2,400 and 1,900BP and between 600BP and the present.

Lees & Clements (1987) used radiocarbon dates from seven chenier sequences from northern Australia (including two from the Gulf of Carpentaria) to seek regional patterns in the sedimentation record. Their statistical analyses indicated that a non-random (at about the 1.5% level of significance) increase in ridge formation occurred 2,800-1,600BP across northern Australia. They concluded that this period is related to a reduction in fluvial sediment supply to the coast and thus to a period of decreased wet-season precipitation.

## STUDY AREA GEOMORPHOLOGY

### PATTERNS OF BEACH RIDGES

The coastline of the study area (Fig. 1) exhibits different orientations about a major nexus at Bayley Point. Point Parker and Bayley Point project to the northeast, each along a line which links bedrock inliers and island groups. The coastline trending southeast from Point Parker is an arcuate embayment, which has a centre near Bentink Island and extends for some 55km to Tarrant Point. The deltaic sediments of the Nicholson River and Lily Creek are significant in contributing to the generation of the southern parts of this distinctly curved coastline, that cuts across earlier prograded deposits. West from Bayley Point the coast trends west-northwest. Interruptions to this general trend are associated with exit points of creeks and with bedrock inliers such as between Cliffdale and Eight Mile Creeks.

Pleistocene beach ridges (Qpm) are present in two distinct types. Ridges parallel to the coast, so common on the west coast of Cape York Peninsula, are poorly expressed and are up to 9km inland. Complex, low sandy forms, wrapped between and around lines of bedrock inliers running out through Bayley Point and Point Parker, are more abundant.

Holocene beach ridges are present along the coastline of most of the study area. Depending on

definitions, three or four well-defined sets (probably equivalent to Smart's (1976b) Qhm<sub>2-4</sub> units) can be identified for up to 500m inland. Older Holocene ridge remnants (Qhm<sub>1</sub>) are present up to 700m inland. The locations of the field transects across the Holocene beach ridges at Bayley Point (Fig. 2) are very generalised and do not show the details of the beach ridge sets visible in air photos observed at other locations.

### TOPOGRAPHY AND LITHOLOGY AT STUDY SITES

Ideally, more than one topographic profile should be located and levelled in across the general trend of a chenier/beach ridge sequence. This allows for improved knowledge of spatial geometry and some assessment of variability in ridge shape and position relative to known sea-level or tidal position. However, field conditions in 1988 (availability of vehicles, accessibility and the time available at a particular location) meant that only reconnaissance work could be done.

Three transects were established for geomorphological work; two at Bayley Point (Fig. 2) and identified as BPT1 (300m long) and BPT2 (345m long); and, one at Old Doomadgee (not illustrated) and identified as ODT1 (1,000m long). Each geomorphological transect was sited to cut across the linear trends. A topographic profile along each transect was established by compass, tape and clinometer. Figure 20 shows the topographic profiles and lithologies for transect BPT1. The lithologies in each hole were drawn as down-the-hole logs. Major lithological features were used to make correlations between holes.

Auger hole sites were selected using a knowledge of topographic variability and of surface soils and lithologies. Three holes were drilled on transect BPT1 but none on BPT2. Two other holes were drilled at Bayley Point: hole BPM3 was drilled as an extension below an archaeological excavation of a mounded shell midden (BP3) to test for conditions and lithologies beneath the midden (Fig. 22a); hole BPM3-A1 was drilled about 4m east of the midden to confirm general ridge lithology and to compare with hole BPT1A3 in a similar stratigraphic position (Fig. 22a). Four holes were drilled at Old Doomadgee on ODT1 but they are not illustrated here.

### SHELL MATERIAL FOR AGE DATING

The 4mm fractions were examined to reveal down-the-hole distributions of whole shell and shell fragments. Because of the condition of whole shells in holes BPT1/A1 and BPT1/A3, potential material from near the base of the sedi-

TABLE 1. Schematic representation of Ganggalida Classification of environmental zones in the mainland coastal area.

←-----North			South -----→		
<i>mulara</i> 'sea'	<i>murlapa/mala/lu</i> 'go back/sea/north'	<i>ngarnda</i> 'beach'	<i>dhunwa</i> 'sand ridges'	<i>gubara</i> 'saltpan'	<i>Gin gara</i> 'flat country'
	[inter-tidal zone]		[multiple ridges]		[on other side of saltpan]
			area containing ←- <i>murchomurra</i> -→ 'islands'		
←-----'saltwater country'-----→					'mainland' 'land' <i>wambulda</i>

mentary units towards the top of the ridges were closely scrutinised for their suitability for  $^{14}\text{C}$  dating. The *Anadara granosa* valves selected from depth intervals below 100cm from the surface are considered to be below the base (80cm) of the largest mounded shell midden identified at Bayley Point. Consequently, the shells' dates are likely to indicate the last phase of formation of their respective chenier ridges.

The lithologies encountered at depth intervals below 100cm in the auger holes are unconsolidated, and include a rudaceous, fragmental, shelly quartzose sand in BPT1/A1 80-100cm, a quartzose sand in BPT1/A3 100-120cm, and a shelly sand in BPT1/A3 120-140cm. They do not resemble the lithologies from the known mounded shell middens. Shell samples were submitted for age dating (Fig. 20). All shell dates reported have been adjusted for  $^{13}\text{C}/^{12}\text{C}$  and for Reservoir effect ( $-450 \pm 35\text{BP}$ ). The outer ridge (A1) was dated to  $670 \pm 80\text{BP}$  and the inner ridge (A3) was dated to  $2,120 \pm 80\text{BP}$ .

## ANTHROPOLOGY

### LANGUAGE

The length of coastline between Point Parker and Eight-Mile Creek falls within what is known among contemporary Aboriginal people as "Ganggalida country", Ganggalida being the name of the language traditionally spoken by those inhabiting this land. Ganggalida was spoken beyond this area, as far westwards as the wide Massacre Inlet (some 22km west of Eight Mile Creek), and as far to the southeast as Moonlight Creek (some 30km along the coast from Point Parker). While Ganggalida speakers quite likely extended inland from the coast for a considerable distance (possibly up to 100km), the focus of this study is on aspects of coastal Ganggalida society.

Linguistic work indicates that the abutting language inland to the south, Nguburinji (Fig. 3), was mutually intelligible with Ganggalida, and in fact that these two, together with Yanggal (on Forsyth Island) and Gayardild (on Bentinck Island), were dialects of one language. Layardilda or Lardil (on Mornington Island) was a different but closely related language (Keen, 1983: 192; Evans, 1985: 3). These languages collectively constituted the Tangkic sub-group (Evans, 1984); Tindale's discussion of the relative isolation (1962a: 278, 1977: 256-257) of the language of the Bentinck Islanders is inadequate (cf. Evans, 1985: 9).

### SOCIAL ORGANISATION

Tindale's failure to consider the relative homogeneity of an Aranda type kinship system throughout this region also renders problematic his suggestions (1977: 258-60) about the lengthy isolation of the Bentinck Islanders. Evans (1985: 21-22) suggested a relatively short period of isolation of the Gayardild (500-1,000 years), based partly on this matter of kinship similarity. However, Tindale (1977: 258-9) referred correctly to the marked lack of any system of named social categories (or class system as he put it) on Bentinck Island in comparison with elsewhere throughout the region; though his expression of this fact is at best imprecise in implying that the surrounding groups had sections. Evans' (1985: 17) expression of the comparison also lacks precision in suggesting that the Mornington Islanders and those on the mainland had moieties and sections. What has operated throughout the region, except on Bentinck Island, is a system of named subsections (Trigger, 1985: 69-71, 350-351), though this system can be said to be organised as unnamed patrilineal semi-moieties and moieties (Sharp, 1935: 159; 1939: 455).

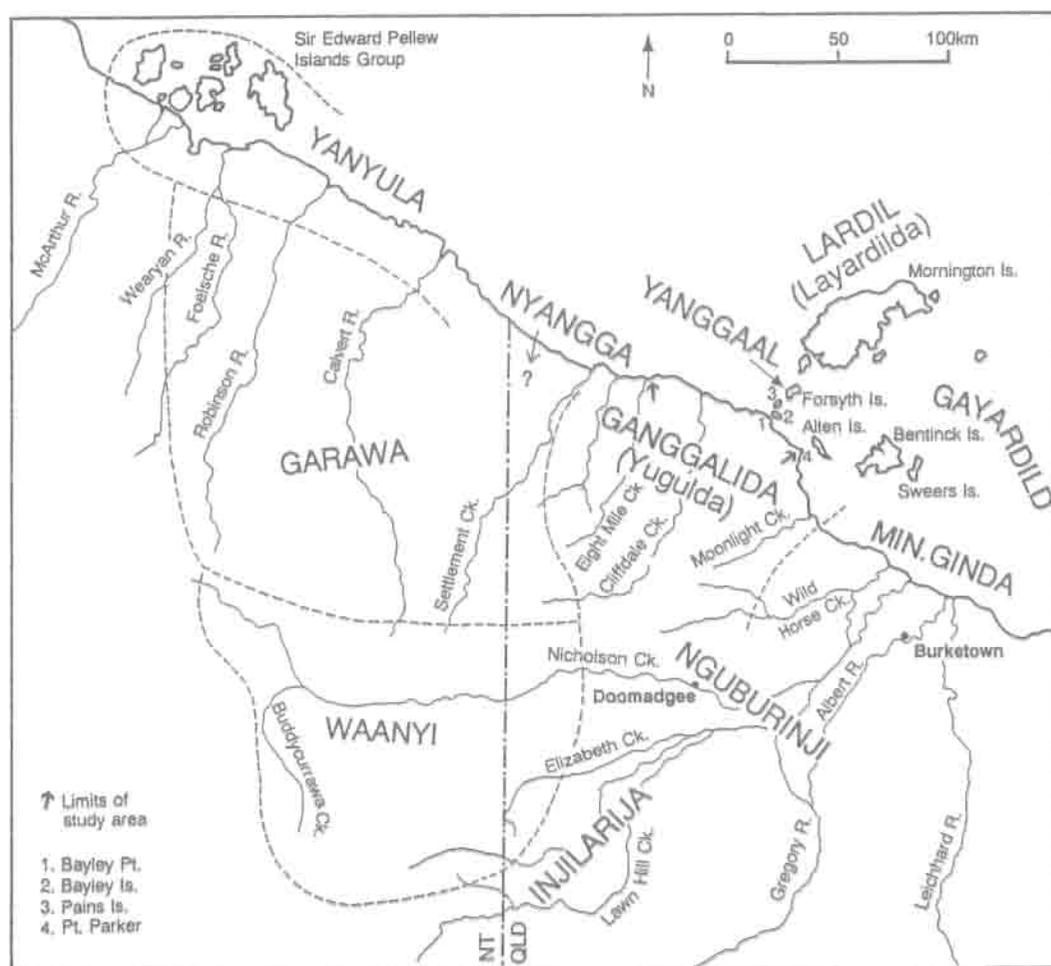


FIG. 3. Linguistic territories from an Aboriginal perspective in the study area and nearby areas.

Putting aside the distinctiveness of the Bentinck Islanders in this respect, and without discussing social organisation in detail here, it is sufficient to note the situation of the coastal Ganggalida people on the mainland. They were included within the mainland bloc stretching to the southwest in having both male and female subsection terms, and were only partly similar to the inhabitants of the North Wellesley Islands in that the latter had male subsection terms only (Sharp, 1935: 162, fn. 4). They lacked the named semi-moiety terms that operated within at least the western parts of Garawa country to the west

of Ganggalida country (Sharp, 1935, 1939; Reay, 1962; Trigger, 1989).

The coastal Ganggalida also apparently lacked the institutionalised role distinction of ownership and managership in relation to land and ritual property, which operated to the west and southwest (Trigger, 1985: table 5). Although it is difficult to reconstruct their pre-contact ceremonial life because of more recent influences from the west, it is most likely that the coastal Ganggalida lacked the major cult ceremonies in which the ownership/managership distinction is so important. In these respects, they were identical to the inhabitants of all the Wellesley Islands.

## THE TRADITIONAL SYSTEM OF LAND TENURE

Along the coast the landscape is divided into estates, which people term *dulmarra*, or nowadays in English, countries (Fig. 4). The lines running southwards from the coastline mark the approximate lines of demarcation between the estates. Each estate contains a number of named sites, as well as some places of significance, which are unnamed. The environmental features, which are named, are quite varied. If estate J is taken as an example the named features include: the entire Eight Mile Creek watercourse, a section of beach, saltpan areas, particular swamps/lagoons, a well dug out as a water source, a place where an area of trees growing along a sand ridge stops adjacent to a watercourse, and a shallow crossing place on a watercourse.

Each estate contains within it at least one major totemic significance or 'dreaming'. There are typically also other dreamings believed to be present in these estates. Some of them are site-specific, while others have significance across more generally defined areas. Each of the major dreamings, and hence each estate, also have what Ganggalida people gloss in English as 'skin' association. According to Ganggalida ideal belief, a skin is shared by a major dreaming, the estate in which it is located, and the people who inherit the country patrilineally. Each estate has one of four skin or subsection-couple/semi-moiety associations (Fig. 4).

The system of knowledge regulating traditional land ownership is also complex. People inherit their fathers' countries, or to put in it terms of the principle of patrilineal descent, they inherit the estate of their patrilian. Thus, men and women (and children) have primary ownership rights to their *dulmarra*, their father's estate (which is commonly also their father's father's estate). However, individuals also have important rights to their mother's father's estate (termed *mangayi*), and other ties to the estates of their mother's mother and father's mother. Yet other ties to land operate through what is termed in the literature 'conception filiation' - that is, a person is known to have an intimate tie to the place (and the dreaming there) where he or she is believed to have been spiritually conceived. Thus, these (and other) principles in combination determine the relationships between Ganggalida people and their country.

Three senior individuals can be taken to illustrate briefly the ways people were linked closely with a number of estates in coastal Ganggalida country (Fig. 4). For the first woman, her father's

father's country is estate F (and her 'conception' place is also within this estate), her mother's father's country is estate I, her father's mother's country is an area within estate E, and her mother's mother's country is estate G. She was actually born in estate H. For the other two people (brother and sister), estate F is their mother's father's country and their mother's mother's country is in an estate on the west side of Massacre Inlet; although their father came from an inland area of Waanyi country on the Nicholson River, he died at a place in estate J close to Eight Mile Creek and this place is thus highly significant for them. In addition, the brother's conception place is a site within estate E, and he was actually born at a site within estate D. Individuals such as these three senior people, thus had cross-cutting ties to many areas within Ganggalida country, and their descendants inherit similarly widespread spiritual and other links to the landscape.

## TRADITIONAL LAND USE

It is important to note the distinctiveness of the coastal area in the regional Aboriginal perspective. It is described as 'saltwater country', and is divided into microenvironments in Ganggalida terminology (Table 1). As the English translations indicate, the environment consists of long sand ridges (supporting open woodland) typically parallel to the beach and dune areas. These raised ridges are separated by flat sandy stretches of ground varying considerably in width. In some areas, 'salt pans' or saline coastal flats separate the sand ridges, but the widest area of saltpan is usually between the most inland sand ridge and the beginning of sharply defined open sclerophyll woodland which extends inland to the south.

From the Ganggalida perspective the sand ridges are termed 'islands' (*murndamurra*). The same term is used for the small islands immediately off-shore. In the Aboriginal view, the 'land' or 'mainland' (*wambalda*) thus begins at the inland limit of the saltpan, which also marks the inland limit of what is generally known as saltwater country. The limit of the coastal strip designated 'saltwater' country, extends southwards for distances varying between 3-10km from the beach (Fig. 4). At times during the wet season, many of the saltpan areas are said to be covered with water, probably from tidal surges as well as from the flow of fresh water from the inland, leaving the 'island' sand ridges isolated with water on all sides.

In the Ganggalida view, the coastal strip is re-

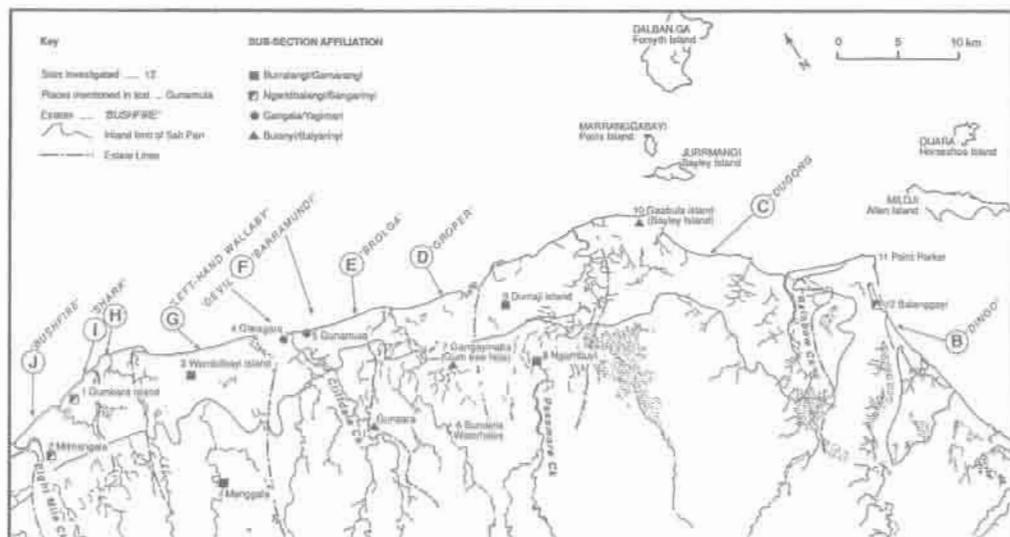


FIG. 4. Knowledge of territory in coastal Ganggalida country.

garded as environmentally distinctive and different from further inland, and is conceived (in general terms at least) as containing areas equivalent to the close off-shore small islands. However, this narrow coastal strip should not be considered as socially isolated in any way. Figure 4 indicates quite definitive boundaries for the coastal estates, to the east and west; the boundaries are hence the sea to the north, and creeks and salt-arms to the east and west. But the boundedness to the south (i.e. in an inland direction) is much less clearly defined. All estates except one in the area shown in Fig. 4 extend across the saltpan to the 'mainland' to include one or more fresh waterholes. In the case of the exceptional estate (F), it includes site F1 (Gunamula), a large freshwater lagoon near the mouth of Cliffdale Ck. The lagoon is said to contain surface water for a substantial part of the dry season.

Seasonal movements across the saltpan to waterholes occurred particularly during the middle and late stages of the dry season. This movement was not so much because of a lack of fresh water in saltwater country (for this is said to have always been available by digging 'soaks'), but in order to obtain certain material resources apparently not at this time readily available on the 'islands' (e.g. water lilies, *Nymphaea* sp. and *Nymphoides* sp.). During parts of the dry season people are also said to have come to the coastal strip from a consider-

able distance inland. This part of the Gulf coast was reportedly of particular significance for people further to the west and inland, because a site located within estate E was regarded as the place to which the spirits of recently deceased persons went. This temporary sojourn was before the spirits proceeded northwards from the beach to a place described in English as 'the middle of the sea'. In any case, inlanders apparently rarely remained in saltwater country during the wet season because of their lack of tolerance of the increased number of mosquitoes.

The significant point here is that, apart from the recognition of the environmental distinctiveness of saltwater country, people are said to have moved in and out of it constantly. Nevertheless, it was viewed as the distinctive domain appropriate to a conceptually separable group of 'saltwater people'.

Furthermore, movements within saltwater country were reportedly extensive and constant. Land-using groups are said to have typically been based within the estate of the patrician core of the group. However, people also moved freely along the coast, visiting sites and areas to which they typically had a multitude of social ties. Having made this point, it is important to note one grouping within these saltwater people who were particularly thought to 'belong beach side' in the area between Bayley Point and Point Parker (i.e. the coastal mainland area immediately opposite both the North and South Wellesley Islands, and

incorporating a distance along the coastline of approximately 20km). These are people said to have routinely visited several small islands comparatively close to the mainland (namely Bayley and Pains Islands approximately 3km and 4.5km off Bayley Point respectively, and Allen Island approximately 5.5km off Point Parker).

These beach side people were thus regarded by other coastal mainlanders (at least those to the west) as particularly closely oriented towards the immediately adjacent small islands to the north and east. Indeed, it is probable that these people spent substantial time on the close off-shore islands, in regular contact with Yanggal speakers based on Forsyth Island. They also had occasional contact with Layardilda (Lardil) people from Mornington Island, and perhaps even sporadic contact with Bentinck Islanders who may have travelled across to Allen Island. The latter contact would have involved safely traversing a distance of 13km by watercraft (raft), and Tindale (1962b: 298-301) gave accounts of two attempts (in 1940 and late 1946 or early 1947, prior to major intervention by European Australians) where lives were lost. In the second attempt, 14 out of 19 persons attempting the crossing were drowned, and there is little doubt that such trips would not have been undertaken without knowledge of the great danger. Yet, it is likely that the factors reportedly leading to the 1940s crossing attempts (particularly quarrels and fights), among others, would have, in earlier days, led to sporadic successful crossings by small numbers of people from Bentinck Island to Allen Island. Tindale (1962a: 273, 290-1) cited oral traditions among the Bentinck Islanders which recounted occasional hostile encounters with mainland Aborigines on Allen Island. Evans (1985: 15-16) suggested that 'whatever contacts there were, that did not end in death or exile, must have been separated by decades of isolation'; he also mentions that nothing was obtained by the Bentinck Islanders via trade.

Memmott's (1985) work comparing the material culture repertoires of the Bentinck and Mornington islanders indicated the former as containing a much smaller number of artifacts. It is most likely that the Bentinck Islanders also differed from the mainland coastal Ganggalida in this respect. Nevertheless, previous research (Trigger, 1987) demonstrated a substantial degree of similarity in the material culture of coastal mainland and off-shore island societies, compared with nearby inland society to the west and southwest. As saltwater people occupying salt-

water country, the coastal mainlanders can be regarded as part of the island cultural bloc in significant respects. Coastal mainlanders and off-shore islanders were seemingly oriented towards marine resources as the mainstay of their diet. This is particularly evident in the case of the beach side people occupying the two estates between Point Parker and Bayley Point; significantly, there are fish traps constructed from rock on this section of coastline and also on a number of the off-shore Wellesley Islands. These were reportedly used to procure substantial quantities of marine resources, although this procurement may well have been more intense during the dry season than the wet.

Yet the material culture of coastal mainland society has simultaneously emerged as similar to that of inland society in certain respects. While the material culture repertoires of the mainland coast and islands are strikingly similar in significant ways, it would be inaccurate to define them collectively as a homogeneous material culture tradition completely separate from that of the inland.

## DISCUSSION

It seems quite clear that the coastal mainland environment influenced the nature of Ganggalida society in a number of important respects. In particular, this society was oriented towards a hunter-gatherer economy focused substantially on marine resources. Trigger (1987) pointed out that stone tools were not produced on the coast though they were traded from the inland. There are several comments in the early literature which posit the coastal (and island) material culture as more 'primitive' than that of inland societies. For example, Roth (1909: 200) described the type of spearthrower manufactured here as a 'very primitive form of implement'. Similarly, the raft used only along the mainland coast and in the islands has been portrayed (Davidson, 1935: 39-45) as the earliest type of Australian Aboriginal watercraft, this design having given way elsewhere across the northern coastline (except in one area of northwestern Australia) to the supposedly more sophisticated and preferred sewn bark and dug-out canoes. However, as Trigger (1987: 76-77, 80) discussed in some detail, the coastal and island spearthrower cannot be regarded as underdeveloped in terms of functional performance, and the raft may well have offered greater stability and safer transportation in the coastal and island environment.

Dug-out canoes appear to have been used in

this region by the late nineteenth century. Yanyuwa people from the west are said to have been visiting from this period; at times using dug-outs with attached sails and mast for propulsion (Baker, 1988). The technology for making and using dug-outs was received among Yanyuwa people (and possibly those in the Wellesley Island region) from Macassans. Just when dug-outs began being used among coastal Ganggalida people is difficult to say; however, this may have been occurring by the mid-nineteenth century or earlier (Peterson & Rigsby, in press).

The summary point to be made, is that Ganggalida coastal society shared similarities with a number of adjacent societies, but was also different from them in various ways. The ethnographic record indicates adjacent societies in differing environments involved in a complex pattern of overlapping cultural and social forms. On the basis of a more detailed presentation of data elsewhere (Trigger, 1987), it can be argued that the mainlanders' relationship with the North Wellesley Islanders in particular, has historically reinforced the maintenance of cultural differences between coast and inland on the mainland.

## ARCHAEOLOGY

Prior to this work no detailed archaeological research had been undertaken on the southern Gulf of Carpentaria coastline. Indications of archaeological features had been provided by the early descriptions of the Point Parker fish traps (Boyd, 1896: 57), and Connah & Jones, from the University of New England, photographed the fish traps at Bayley Point from the air in 1982 (Trigger, 1987). A brief archaeological survey was undertaken of Sweers Island in 1982 (Robins, 1982) and of a burial site on Mornington Island (Memmott & Robins, 1984). Some archaeological survey work has been done in the Burketown (Horsfall, 1988) region. The closest recorded coastal archaeological work is that of Haglund (1975) and Thorley (1992) in the vicinity of the McArthur River, some 300km to the west, and 700km to the east on the west coast of Cape York Peninsula at Aurukun by Cribb (1986) and a further 100km to the north at Weipa by Wright (1971), Bailey (1977, 1994) and Beaton (pers. comm). Two hundred kilometres to the south, Hiscock (1988) undertook extensive archaeological work in the vicinity of Lawn Hill Gorge.

## RESEARCH AIMS

The lack of prior archaeological work in this area necessitated a basic reconnaissance survey

strategy. The aims of the archaeological survey were threefold:

- 1) to characterise the range of archaeological sites that occur in the study area and place them within an environmental context;
- 2) to compare this evidence with documented Aboriginal use; and,
- 3) to investigate selected sites in some detail with a view to obtaining dated occupation sequences and more detailed archaeological evidence.

Through the use of this strategy, some explanation for the patterns in the archaeological evidence could be derived in addition to obtaining descriptions of the archaeological evidence.

To do this the survey concentrated on examining:

- a) areas where archaeological sites were known to exist. This applied particularly to the stone wall fish traps at Bayley Point and Point Parker;
- b) areas where Aboriginal occupation had concentrated within the last 100 years; and,
- c) areas that represented some of the different environments found in the southern Gulf of Carpentaria.

The survey was constrained by a number of factors including:

- a) a region that was isolated, that had few roads or tracks and that had difficult survey conditions including extensive saline flats and deep estuarine creeks; and,
- b) general lack of documentation about the area including detailed maps and faunal, floral or geomorphological work.

These difficulties were offset to some degree by detailed Aboriginal knowledge of the area.

Apart from those areas where sites were known to exist, selection of the areas to visit were largely dictated by Aboriginal people and their desire to re-establish ties with particular areas and to document the social significance of those areas. This project was, therefore, a joint community-academic research endeavour. The initial survey was undertaken in September, 1983. The excavations at Bayley Point and Old Doomadgee were conducted in April, 1988.

*Methods.* The area surveyed at each location was largely dictated by the amount of time that was needed to record the social information at that site. The exceptions were at Point Parker, where a detailed survey of the fish traps there was undertaken, at Bayley Point where the fish traps were surveyed and a small mounded shell midden

excavated, and at Old Doomadgee, where some excavation was undertaken.

At each site as large an area as possible was traversed. The general environment, the geomorphic context and the presence and type of archaeological material at each locality was recorded. Where the archaeological evidence consisted of shellfish remains, its condition, depositional context, the taxa represented, its general density, aggregations of particular species and the erosion affecting the site were noted. Unless otherwise noted, the shell component of the beach ridges/cheniers occurred as highly weathered shell fragments. Culturally derived shell was generally recognisable due to its less weathered and fragmented character, the relatively few species represented, the repetitiveness with which those species occurred, its geographical distribution and its common occurrence as small scatters of individual species. Some examples of shell were retained for scientific and Aboriginal identification. In the case of fish traps, detailed mapping and the recording of individual features was undertaken. Where more detailed methods were involved, these are outlined in the relevant section. The areas investigated are listed below.

#### SURVEY AREA 1

*Aboriginal Name.* Dumbara

*Location.* 8km east of the mouth of Eight Mile Creek. (Fig. 4).

*Environment.* Dumbara is a triangular piece of land bounded by the coast on one side and by a forked estuarine creek on the other two. The foreshore vegetation is dominated by Mangrove communities. Immediately behind this is a narrow strip of saline coastal flats dominated by the salt tolerant succulent *Halosarcia indica* with the creeper *Sesuvium portulacastrum* (Fig 5).

Behind this is a series of low, parallel to sub-parallel Holocene beach ridges. The crests of the beach ridges are relatively narrow and the dunes are close together. They are pock-marked with a series of large circular depressions and shallow gullies have intersected the dunes in parts. Tussock grass is on the crests and open woodland on the lower slopes and in the swales. The woodland species include *Pandanus* sp. (Screw Pine), *Celtis paniculata*, *Terminalia subacrotaria*, *Hibiscus tiliaceus* (Cotton Tree), *Canarium australianum* and *Eucalyptus polycarpa* (Grey Bloodwood). *Opilia amentacea* and *Asparagus* sp. are also present. Ground cover varies between 40-60%.

*Ethnographic Significance.* People were said to have lived at Dumbara mainly during the dry season, as there is no tea-tree bark available to use as shelter

from the heavy rains of the wet season. However, given other comments about gradually drying up water sources on the "islands", it seems most likely that occupation would have been intermittent rather than continuous during the dry season.

This was a place known among people far to the west because of its totemic properties; it is linked in a song cycle to Manan.gurra, an area which is noted in the ethnographic record as a centre for ceremony during the early decades of this century. Manan.gurra is approximately 200km west of Dumbara and is known for *Cycas* sp. trees, which provided a major food source for the ceremonies. Because of the mythic linkage between the Dumbara and Manan.gurra areas, people are said to have moved between them at times. This movement possibly increased during the early stages of European contact, and prior to that, during the period of Macassan contact with the Yanyula people living in the Manan.gurra area (and on the Sir Edward Pellew Islands). It was from the Macassans that the Yanyula people adopted the use (and construction knowledge) of dug-out canoes, and these watercraft allowed quicker (and probably safer) travel along the coast. Nevertheless it is possible that substantial movement between the Dumbara and Manan.gurra areas was not uncommon prior to the Yanyula adoption of dug-outs.

Ganggalida oral tradition recounts how cycad trees once grew on and around the Dumbara "island", but that Shark dreaming, after being provoked, flew into a rage and pulled all the trees from the ground. He tied all the fruit and trees up with tea-tree bark, and moved off westwards through the sea, leaving some plants at various places, but taking most of them to Manan.gurra. The depressions in the sand dunes at Dumbara are said to represent where the cycad trees were ripped out of the ground.

Whether an interpretation of this myth might posit a previous period when cycad trees actually grew on Dumbara is an interesting question; alternately, the myth might simply be seen as contrasting Dumbara with well resourced areas to the west of the same semi-moiety. The latter interpretation views the myth as a type of commentary on the lack of this major food source at Dumbara, and perhaps more generally, the comparative lack of it throughout Ganggalida country.

A number of myths entail song cycles that link areas in coastal Ganggalida country with areas of country to the west. Like this Shark myth, the various routes are sung in rituals.



FIG. 5. Extent of archaeological survey at Dumbara.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 1.5km<sup>2</sup> (Fig. 5).

*Site Description.* Archaeological material comprises shell scatters associated with deflation hollows in coarse, compact, pale red, shelly sand

along the length of the crests and upper slopes of parallel beach ridges. These dunes are between 1.5-2km south of the shoreline. No archaeological material was found on the saltflats, the beach, the inter-beach ridge swales or in mangrove areas.

On the first ridge to the south of the saltflats shell material is found in patchy concentrations (to 5m<sup>2</sup>) with shell densities of to 100 valves /m<sup>2</sup>. On the second ridge the maximum densities are similar, although the average size of the shell concentrations are up to 25m<sup>2</sup>, and the general distribution of shell is greater. Concentrations of one or two species are common on both ridges.

Species noted included *Anadara granosa*, *Placuna placenta*, *Katelysia hiantina*, *Volema cochlidium* and *Telescopium telescopium*. Observations of shell eroding from deflated surfaces indicate that none of the *in situ* deposits contributing to the scatters were from depths greater than 15cm.

A large tree on the northern slope of the second ridge bears scars where six footholds (each approximately 10cm x 5cm) had been cut into the trunk. People obtained water from wells, although no wells were located during the survey.

#### SURVEY AREA 2

*Aboriginal Name.* Milmangala

*Location.* 3.5km southeast of the mouth of Eight Mile Creek, 3.5km south of the coast (Fig. 4).

*Environment.* Milmangala is on the southern slope of a broad, extensive dune system of probable Pleistocene age. The lower slopes of the dune are vegetated with low open woodland of *Pandanus* sp. and *Grevillea* sp.; the upper slopes and crests with grassland where surface visibility was 70%. Immediately to the south lie extensive saline flats while to the north lie a series of alternating dune

systems and saline flats. These terminate at the mangrove fringe 3.5km to the north.

*Ethnographic Significance.* In recent times this was used as a well - i.e. known as a reliable water source. It was said to be a place where large numbers of people commonly camped, but it was no doubt used intermittently.

This is one of the sites in estate J which, together with others, illustrate the diversity of environmental features which are named — by no means are only sites known for their rich resources named and given cultural significance; e.g. the name Lumbuyi is applied to the 'point of timber' where vegetation stops adjacent to a watercourse.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 1.0km<sup>2</sup>

*Site Description.* The site is located in loose, coarse, red sand on both sides of a small, heavily vegetated gully that terminates some 200 m to the south at the saltflats. Away from the gully the vegetation comprises grasses and the occasional *Eucalyptus tessellaris* and *Grevillea acacia*. The archaeological evidence consists of a very thin and patchy distribution of shell fragments with <1 fragment/10m<sup>2</sup> over the entire surface of the surveyed area. The only identifiable fragments are of *Anadara granosa*. A well at the site provided fresh water.

#### SURVEY AREA 3

*Aboriginal Name.* Wambilbayi or Wambilbayi Is.

*Location.* 9.5km west of the mouth of Cliffdale Creek, 2.5km south of the coast (Fig. 4).

*Environment.* Broad, extensive east-west trending dune of probable Pleistocene age. The crest of the dune is predominantly open grassland with patches of shrubs, probably *Grewia retusifolia* (Turkey Bush) and *Ficus opposita* var. *micrantha* (Sandpaper Fig). The mid-slopes are similar to those of Old Doomadgee (Survey Area 9) with low open — open woodland of *Eucalyptus tessellaris* (Moreton Bay Ash) and *Canarium australium*. Surface visibility is approximately 80%. The bases of the northern and southern slopes of the dune are vegetated with a dense *Pandanus* forest. To the north of the dune are extensive saline flats blocked from the sea by a narrow belt of Holocene beach ridges. Immediately to the south lie a series of highly eroded dunes interspersed with mudflats.

*Ethnographic Significance.* A senior man gave the example of people moving from this site inland from saltwater country across the saltpan to the site Manggala, a more permanent waterhole

likely to have water lilies for a longer part of the seasonal cycle than lagoons between the islands such as Wambilbayi, where the lilies would only be present for a short time after cessation of wet season rains. The inclusion of Manggala within the estate focused on Wambilbayi is also an example of how most coastal estates encompass at least one freshwater source inland across the saltpan, which could be visited easily and constantly. A major totemic feature in this area is Left-hand wallaby dreaming (Jagujagu).

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 2.0km<sup>2</sup>

*Site Description.* The survey comprised a 200m wide transect from the edge of the southern saline flats to the northern saline flats. Only a very sparse distribution of shell fragments was located in the loose, coarse, red sand. Much of the shell is associated with deflation hollows and had been disturbed by cattle. The maximum concentrations are approximately 1 fragment/20m<sup>2</sup>. Fragments of shell exposed in a deflation hollow indicate that shell has been buried up to a depth of about 10cm. The shell species found were predominantly *Anadara granosa* with some *Katehysia hiantina*. There were no concentrations of particular species. A quartzite grindstone with one abraded surface was also noted (20cm x 20cm x 5cm).

An old well was located by a senior Ganggalida man on the southern side of the dune where it abutts the saline flats, and was re-excavated to obtain freshwater.

#### SURVEY AREA 4

*Aboriginal Name.* Giwagara

*Location.* On the western side of the mouth of Cliffdale Ck (Fig. 4).

*Environment.* A series of low, parallel Holocene beach ridges bounded by the Cliffdale Creek estuary on the east and a sandy-shelly beach on the north. Sparse vegetation on the crests consists predominantly of Mangroves. *Hibiscus tiliaceus* (Cotton Tree) grow in the swales. Giwagara supports the same vegetation as Gunamula, (Survey Area 5), which is located immediately opposite on the eastern side of Cliffdale Creek. Surface visibility was 90%.

*Ethnographic Significance.* Because of its potentially dangerous totemic qualities (Ngabaya - Devil dreaming), people are said not to have camped much on 'Giwagarra Island'; they are said to have camped only in the vicinity of the

well. In particular, they did not proceed inland on the western side of Cliffdale Creek.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 1.0km<sup>2</sup> (Fig. 6).

*Site Description.* Archaeological evidence at Gwigara concentrates around the location of a spring and an old well. This water source is located at the base of the northern side of the second line of dunes, 100m south of the coast. Immediately to the north lies a long swale, which contains water in the wet. Archaeological material, comprising entirely shell, much of it fragmented and disturbed by stock, is found in pale yellow to red coarse shelly sand along the crest and northern slope of the ridge up to 200m east and west of the well site. The density of shell is variable, ranging from 5-100 valves/m<sup>2</sup>. *Anadara granosa* predominates although *Placuna placenta*, *Katelysia hiantina*, and *Telescopium telescopium* were also observed. Concentrations of single species are common.

#### SURVEY AREA 5

*Aboriginal Name.* Gunamula.

*Location.* On the eastern side of the mouth of Cliffdale Creek (Fig. 4).

*Environment.* The central feature of Gunamula is a large lagoon situated in a dune swale between Holocene beach ridges, approximately 200m south of the beach and 400m east of Cliffdale Creek. A series of broad, low relief Holocene beach ridges graduate southward into a series of broad, low relief Pleistocene ones. Termination of the dune system occurs at the saline flats approximately 1.2km to the south.

Gunamula lagoon is located in open tussock grassland on bare pale yellow to red sand (coarse to very coarse with some shell grit), with a variety of widely scattered trees. Rambling and climbing vines are common. Surface visibility is approximately 85%.

Grasses include *Eriachne obtusa*, *Vetiveria elongata* and *Spinifex* (probably *Spinifex longifolius*). Rambling and climbing vines present are *Vitex trifolia*, *Passiflora foetida* (Stinking Passionfruit), *Abrus precatorius* (Crab's Eyes), *Galactia muelleri*, and *Cassytha* sp.

The shrub cover is very sparse but the following were recorded (in order of decreasing frequency): *Tephrosia filipes*, *Cleome viscosa* (Tickweed), *Grewia retusifolia* (Turkey Bush), *Indigofera linifolia*, *Celtis philippinensis* and *Ficus opposita* var. *micrantha* (Sandpaper Fig). *Diospyros ferrea* var. *geminata*, *Canarium aus-*

*tralianum*, *Casuarina littoralis* and *Hibiscus tiliaceus* (Cotton Tree) are the only recorded trees and are widely scattered.

The lagoon itself is fringed with a narrow belt of *Pandanus* sp. (Screw Pine) with *Imperata cylindrica* var. *major* (Blady Grass) dominating the ground storey below. Plants, additional to those recorded in the open tussock grassland, and present on the sandy rim of the lagoon included *Securinega melanthesoides*, *Acacia holosericea*, *Tribulus cistoides*, *Nelsonia brunelloides*, and the large tree *Timonius timon*. To the east of the lagoon there are a series of elongated dunes and swales. The dune swales contain groves of *Melaleuca* sp. (Paperbarks) and/or *Pandanus* sp. (Screw Pine) and/or *Acacia* spp. (Wattles).

*Ethnographic Significance.* This is said to have been a place where people camped frequently; the lagoon holds water into the dry season, and wells provide water for some time after that. The site is associated with at least two dreamings: Devil - a manifestation of which is evident from the trees growing in a line along the middle of the lagoon; and Barramundi dreaming. People moved inland up the creek to the fresh waterhole Gunaara, particularly during drier parts of the seasonal cycle.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 3.0km<sup>2</sup> (Fig. 6).

*Site Description.* The archaeological evidence comprises eight discrete areas of shell scatter or eroding, *in situ* deposits in a series of parallel dunes extending from the coast 1km south. Two thin shell layers exposed in an eroding frontal dune were also recorded.

*Area 1.* A shell scatter measuring approximately 200m<sup>2</sup> on the crest of a vegetated, low ridge within the first dune system. The distribution of shell within the scatter is variable with dense concentrations of up to 1.5m diameter of individual species noted. The shell appears to be eroding from a deposit approximately 10cm below the surface. Species noted were *Placuna placenta*, *Anadara granosa* and *Turritella terebrata*.

*Area 2.* Two shell scatters, measuring approximately 200m<sup>2</sup> and 100m<sup>2</sup> respectively, in deflation depressions on the crest of the second dune ridge. The distribution of shell within the scatters is variable, ranging from 1-100 shells/m<sup>2</sup>. The species represented are *Anadara granosa* and *Ostrea* sp. This shell is weathered and fragmented.

*Area 3.* A shell scatter measuring 900m<sup>2</sup> in a deflation depression in a small ridge within the first

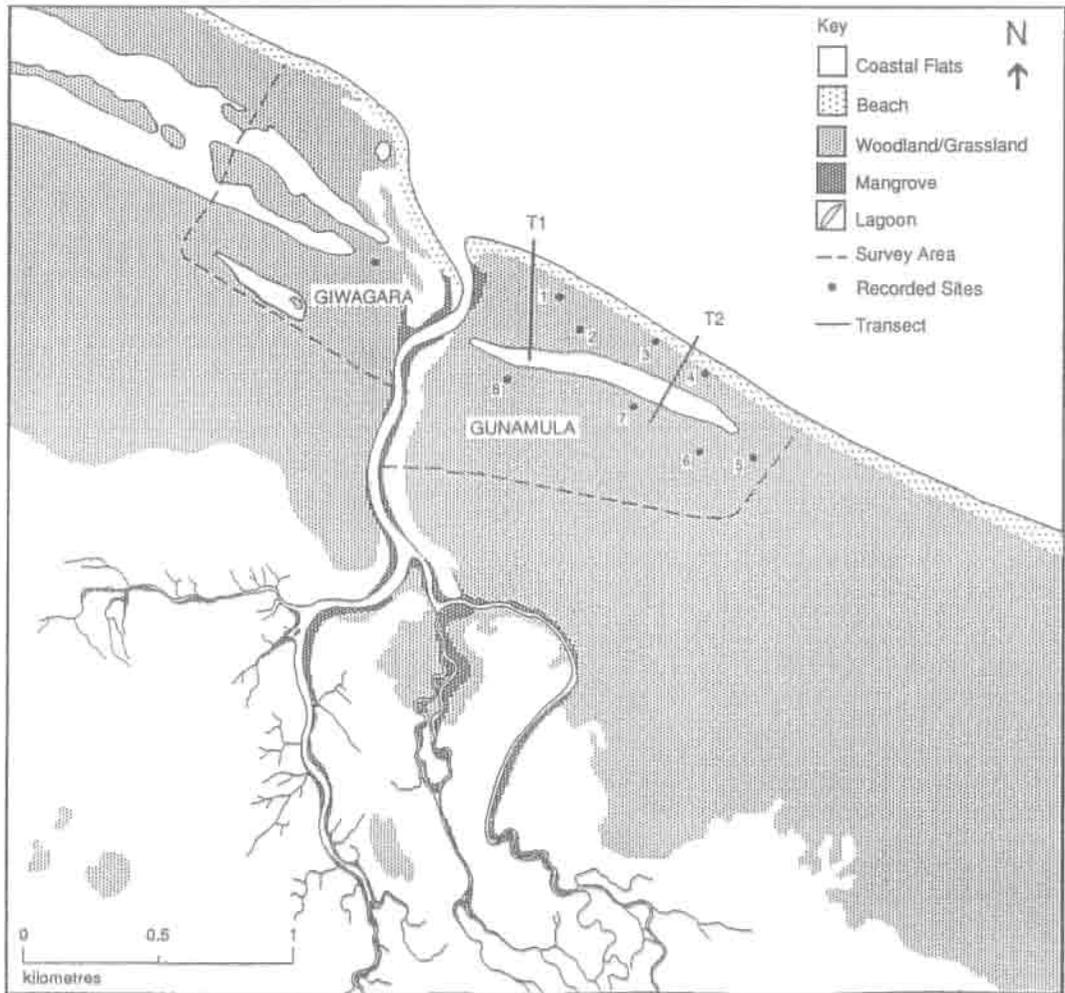


FIG. 6. Extent of archaeological survey at Giwagara and Gunamula.

dune system. The density of material is variable, ranging from 1-100 shells/m<sup>2</sup>.

The predominant species was *Anadara granosa* with some *Polinices didymia*, *Placuna placenta* and *Patro cf. australis* represented. The shells are eroding from a 5cm thick deposit, 10-20cm below the surface.

**Area 4.** Deflation depressions with exposed shell exposed over an area of approximately 100m<sup>2</sup> within the first dune ridge. Some shell is eroding from a thin, *in situ* layer 15-20cm below the surface. The scatter varies in density from 1-100 pieces/m<sup>2</sup>. *Anadara granosa* predominates although coral fragments, pumice, a fragment of *Melo amphora* and laterite, quartzite and chal-

cedony pebbles were also observed. The shell is weathered and fragmented.

**Area 5.** A thin, 20m<sup>2</sup> shell scatter on the southern edge of a low open ridge to the southeast of the eastern end of the lagoon. The predominant species is *Katylsia hiantina* with a variable density ranging from 1-20 pieces/m<sup>2</sup>.

Thin scatters of shell of the same species were observed for several hundred metres south of this point within a series of low confused dunes between swampy depressions. All this shell is highly weathered and fragmented.

**Area 6.** A thin, extensive shell scatter on a low sandy ridge between swampy depressions. The scatter extends along the northern side of the

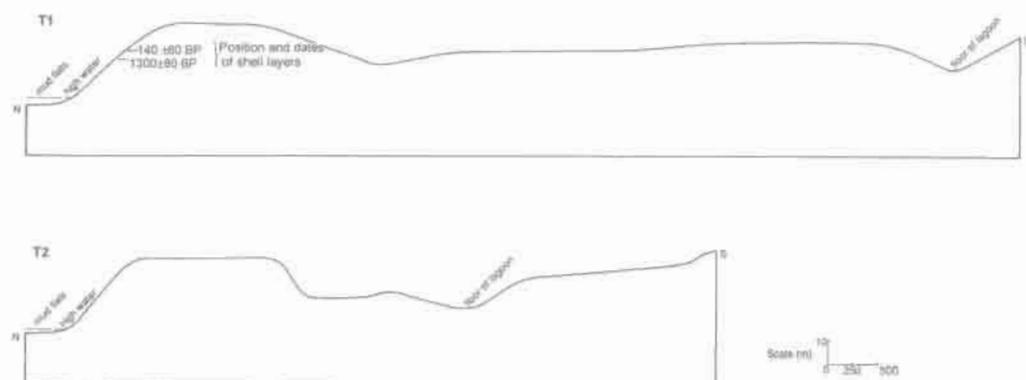


FIG. 7. Cross sections of Gunamula lagoons with position of dated cultural deposits.

ridge crest for approximately 200m. The density of shell is variable but never more than about 10 pieces/m<sup>2</sup>. *Anadara granosa* predominates with some *Katelysia hiantina* represented.

**Area 7.** A small, sparse shell scatter on the northern edge of a dune immediately south of the lagoon. The density of shell (all *Anadara granosa*) varies from 5-10 fragments/m<sup>2</sup>.

**Area 8.** A scatter of fragmented and weathered shell on the crest of the ridge immediately south of the lagoon. The scatter occurs along the dune crest for 100m and for 30m on either side. It varies in density from 1-20 shells/m<sup>2</sup>. *Anadara granosa* predominates with *Placuna placenta* and *Katelysia hiantina* also represented, sometimes as concentrations of single species. A fragment of a sandstone grindstone and small quartzite pebbles were also observed. Shell pieces were observed at a depth of up to 30cm in erosion areas.

**Frontal Dune Section.** Shell was observed eroding out of a section of the face of the frontal dune, approximately 600m east of the mouth of Cliffdale Creek. The deposit in which the layers occur is of a uniform, reddish, dry friable sand. The sand is of medium size (0.5-0.25mm), angular to sub-angular with shell grit and small laterite pebbles throughout. To ascertain the depositional context of this shell and to date it, a small face approximately 30cm deep and 1.6m long was cut into the dune. This section revealed two thin, discrete shell layers. These layers were plotted onto a cross-section profile of the chenier transects. This profile was obtained using a Tacheometer.

Layer 1 occurs approximately 1.75m below the current crest of the ridge (Fig. 7), although it

dips 5° towards the west. This layer is only 1-2 shells thick and comprised a total of 10 shells; 8 *Anadara granosa* and 2 *Paphida* sp. The shells have a mixed orientation and cluster towards the western end. Dated *Anadara granosa* shell from this layer gave a <sup>14</sup>C date of 140±60BP [Beta 12849] (Fig. 7).

Layer 2 occurs approximately 26cm below Layer 1. It is also dipping at an angle parallel to Layer 1 and is only one-two shells thick. Twenty seven valves were revealed in the profile; 4 *Paphida* sp. and the remainder *Anadara granosa*. Small fragments of charcoal were also associated with this layer. The orientation of the shell is mostly horizontal and is concentrated towards the western end of the cut. *Anadara granosa* from this layer gave a <sup>14</sup>C date of 1,300±80BP [Beta 12850] (Fig. 7).

#### SURVEY AREA 6

**Aboriginal (European) Name.** Dalwajinda (Bundella Waterholes).

**Location.** Bundella Waterholes are located on an unnamed stream course 15km southeast of the mouth of Cliffdale Ck, 10km south of the coast (Fig. 4).

**Environment.** A large waterhole on an intermittent creek in gently undulating plains. The plains are covered with low open woodland dominated by *Melaleuca acacioides* (a Paperbark) and *Eucalyptus pruinosa* (Silverleaf Box) with *Melaleuca viridiflora* (Paperbark) also present. Other trees include *Maytenus cunninghamii* and *Excoecaria parvifolia* (Gutta-percha), the latter being a solitary record.

Generally shrubs are scattered. *Petalostigma*

*banksii* (Quinine Bush) are common, occurring in patches; *Grevillea striata* (Beefwood), and *Terminalia canescens* are less common. (An unnamed *Grevillea* sp. was also collected).

The grass layer affords sparse ground cover (0-50%) and contains a number of unidentifiable species including spinifex. *Acacia muperrima* (a woody plant to 14cm) are relatively common in the grass layer.

Elsewhere on the undulating plains *Eucalyptus* sp. (a bloodwood probably *E. polycarpa*), and occasional *Pandanus* sp. (Screw Pine) are present. Northwards, towards the salt flats the vegetation becomes more open and is dominated by spinifex (*Triodia* sp.) and stands of *Cochlospermum* sp.

The waterhole itself is fringed with *Melaleuca nervosa*, *Melaleuca leucadendron* (Paperbarks) and *Eucalyptus camaldulensis* (River Red Gum). *Nymphoides indica* (Fringed Water Lily) is growing in the water.

*Ethnographic Significance.* These are permanent fresh waterholes used particularly during dry times. They are also of importance as a place through which deceased persons' spirits are believed to have proceeded on their way to the coast in the vicinity of the mouth of the "Bundella river". The site is also significant as Brojga dreaming.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 2.0km<sup>2</sup>

*Site Description.* Three quartzite flakes (each approximately 5cm in length) were found in eroded areas of leached brown alluvia at the southeastern end of the waterhole. Although there was considerable gullying throughout the surveyed area, no *in situ* evidence was found.

#### SURVEY AREA 7

*Aboriginal (European) Name.* Garrgayinba (Gum Tree Hole).

*Location.* A series of waterholes 4km north east of Bundella Waterholes, 13km south east of the mouth of Cliffdale Ck, 6.5km south of the coast (Fig. 4).

*Environment.* A series of waterholes in gently undulating plains. These are the same plains in which the Bundella Waterholes (Survey Area 6) are located. Between Bundella Waterholes and Gum Tree Hole the tallest vegetation stratum becomes more open; *Cochlospermum* sp., *Grevillea striata* (Beefwood), and *Excoecaria parvifolia* (Gutta-percha) becomes more frequent. Two species of paperbark including

*Melaleuca viridiflora*, are also present. Ground cover is 20-60%.

*Ethnographic Significance.* Simply a place visited in the course of movements; a source of fresh water, though a bit 'salty' or brackish during September 1983. It probably dries up before the end of the dry season.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 0.5km<sup>2</sup>

*Site Description.* No archaeological evidence found.

#### SURVEY AREA 8

*Aboriginal (European) Name.* Ngambuyi (Konka waterholes).

*Location.* 10.5km southwest of the mouth of Passmore Creek, 8km east of Bundella waterholes, 9km south of the coast (Fig. 4).

*Environment.* A series of waterholes in gently undulating plains with open woodland including *Eucalyptus pruinosa* (Silverleaf Box). The waterholes are fringed with *Melaleuca acacioides* (Paperbarks) and occasional *Eucalyptus camaldulensis* (river red gum). Surface visibility is variable; 50-100%.

*Ethnographic Significance.* Similar comments to Garrgayinba. This waterhole definitely dries up during the dry season. It is associated with a myth about Baby dreaming focusing on an area across the saltpan to the north.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 1.0km<sup>2</sup>

*Site Description.* No archaeological evidence found.

#### SURVEY AREA 9

*Aboriginal (European) Name.* Dumaji (Old Doomadgee).

*Location.* An extensive dune-swale system 7km southwest of the mouth of Passmore Creek, 3km south of the coast (Figs. 4 & 8).

*Environment.* A series of extensive parallel to sub-parallel Quaternary dune ridge systems in parts with well-developed swales forming conditions for lagoons. Near the Old Doomadgee mission site the crests of the major dunes are mostly bare coarse reddish sand with some grass, low plants and rare *Ficus opposita* var. *micrantha*. Elsewhere tree regeneration is evident and the open grassland structure of the major dunes may alter with time. Air photo evidence suggests that the minor dune-swale systems support low open woodland.

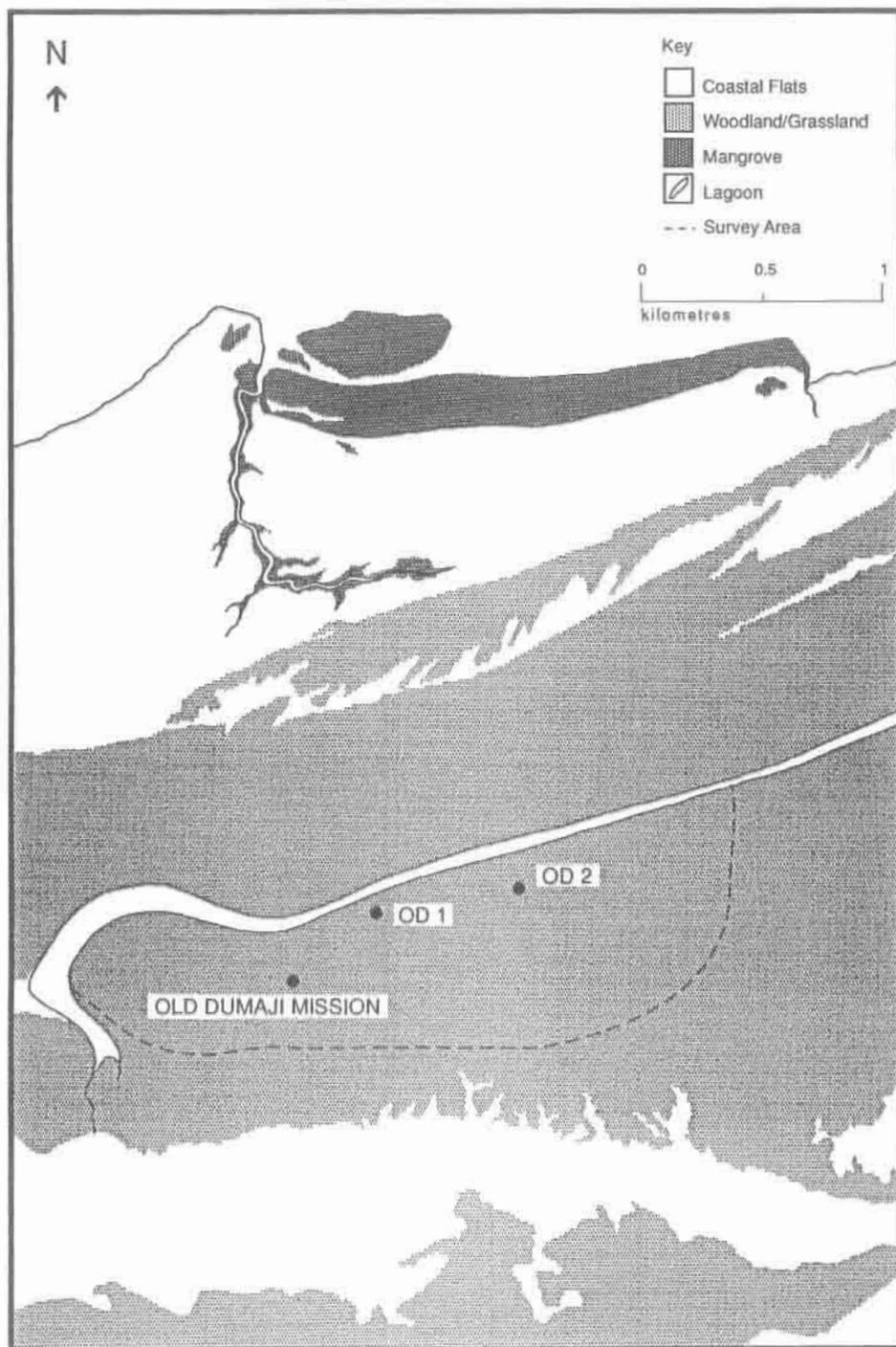


FIG. 8. Location of Old Doomadgee Mission, showing excavated sites and survey area.

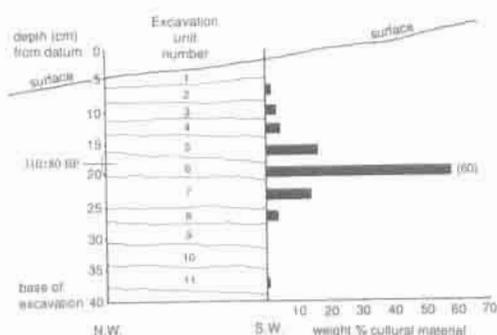


FIG. 9. Profile of Old Doomadgee 1 with proportion of cultural material in each Excavation Unit.

The major lagoon was dry at the time of sampling in September 1983. Areas of dried grass (indeterminate) and *Typha orientalis* (Bulrush) cover the floor of the lagoon. *Solanum* sp. and *Phyla nodiflora* var. *longifolia* are also present.

The lower slopes of the dunes are well-vegetated to densely vegetated in places and provide a conspicuous fringing community. Trees include *Eucalyptus tessellaris* (Moreton Bay Ash), *Pandanus* sp. (Screw Pine), *Melaleuca* spp. (Paperbarks) and *Ludwigia octovalvis*. Generally *Pandanus* spp. dominate the lagoon dune interface, being replaced in some places by paperbarks. The lower dune slopes support open Moreton Bay Ash woodland. The most commonly occurring shrubs are the fig *Ficus opposita* var. *micrantha*, and the more scattered *Grewia retusifolia* (Turkey Bush). *Impertea cylindrica* var. *major* (Blady Grass) dominates the ground storey at the edge of the lagoon. To the north sub-parallel Holocene cheniers border extensive salt pans and mangrove barriers. To the south the Pleistocene dunes border extensive salt flats.

**Ethnographic Significance.** The occupation of Old Doomadgee can be divided into three phases: pre-mission, mission, and contemporary outstation.

Old Doomadgee was an important site for routine Aboriginal occupation until the 1930s. The extensive Lagoon system offered water for considerable periods of the year. When that dried up wells dug at the base of the dunes offered water throughout the dry times. The lagoons and the surrounding dune systems also provided important sources of food.

Several dreamings are present here, including Groper who made the watercourse (swale) along the northern side of the sand ridge which became

the site of the first mission. The name Mawulinji applies to a site on the northern side of the swale, used as a well when the swale dried up. People would cross the salt pan here to travel to other sites such as to Ngambuyi, Yarrnganyarrngana and Mandadarra.

An Afghan man named 'Hoosen' (Hussein?) lived here from 1909 for some years, with his wife of Aboriginal/European descent, and for a while, his White boss. The site subsequently became Old Doomadgee Mission.

In 1931 a Mission was established on the site by the Christian Bretheren. Due to supply and administrative problems and the lack of a permanent water supply this mission was shifted in 1936 to the present site of Doomadgee on the Nicholson River.

Between 1936 and 1980 few Aboriginal people went back to this Site. In 1980, Ganggalida people started to go back to Old Doomadgee in the dry season. An outstation has been established on the site with a number of permanent structures and a bore.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 2km<sup>2</sup> (Fig. 8).

*Site Description.* Despite periods of intense occupation on this ridge, little evidence of this occupation appears on the surface. The archaeological evidence that exists relates to two phases of occupation. The first phase comprises pre-European and contact material associated with the old camp, which lay approximately 730m east of the boys dormitory. A thin scatter of shell with a density of 1-3/m<sup>2</sup> is spread over about 3000m<sup>2</sup> of the crest and upper slopes of the ridge. Species represented are predominantly *Anadara granosa* with some *Katelysia hiantina*. Scattered lumps of coral or calcareous concretions were stated by older Ganggalida people to have been used in the cooking of

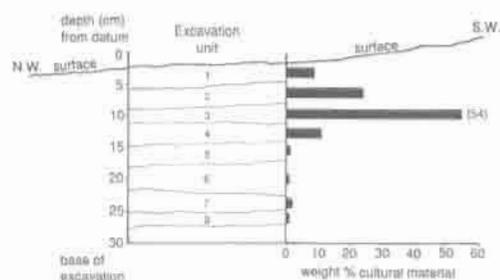


FIG. 10. Profile of Old Doomadgee 2 with proportion of cultural material in each Excavation Unit.

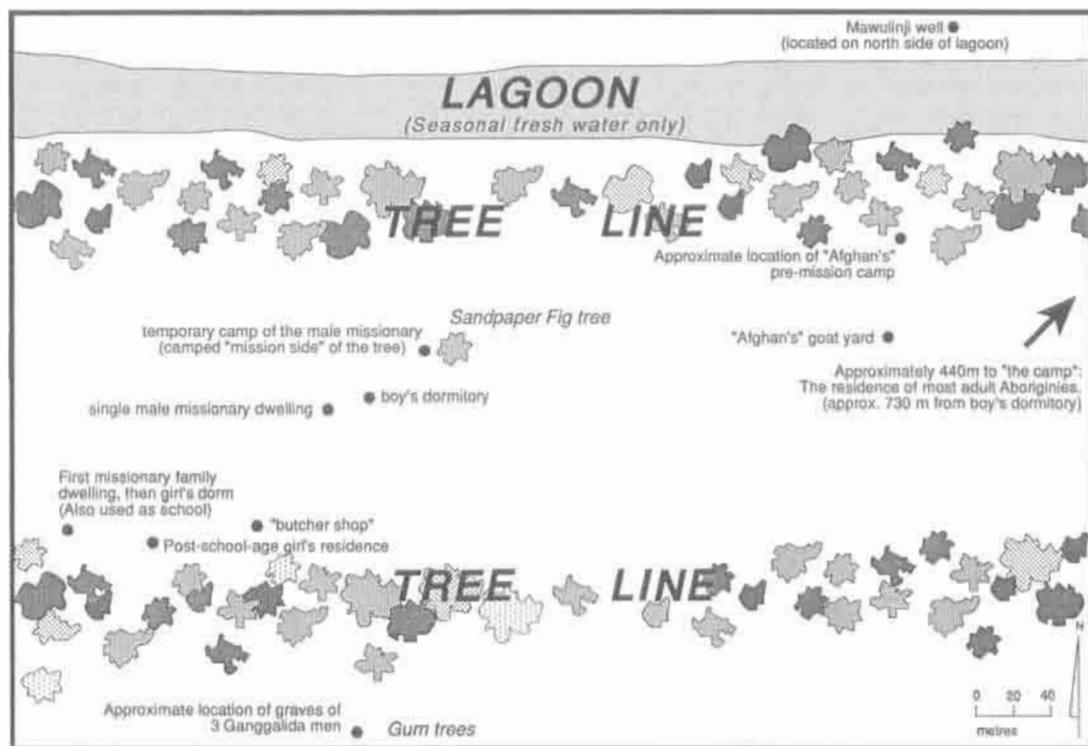


FIG. 11. Plan of Old Doomadgee Mission.

dugong. Fragments of iron were noted and a large flat sandstone grindstone was also found.

Two small test excavations were carried out at selected locations to better determine the character of the archaeological evidence, to describe the evidence of documented occupation, and to obtain material for dating. These excavations were termed Old Doomadgee 1 and 2.

#### EXCAVATIONS

*Methods.* These locations were excavated using 50cm x 50cm pits in the manner described by Johnson (1980). The deposit was sieved on site in a 2mm mesh sieve and all the retained material collected and bagged by Excavation Unit (XU). Grab samples of approximately 200g were retained from the material that had passed through the sieve. Notes on the colour and texture of the deposit were made.

The material retained in the <math>\leq 2\text{mm}</math> sieve was wet sieved, air dried at room temperature and sorted. Shell was sorted according to species and weighed. Whole shells were measured for their length, width, cusp height and thickness. Other

material was sorted according to type and retained. These were both measured and weighed. The 2mm fraction was not analysed.

#### OLD DOOMADGEE 1 (OD1) EXCAVATION

The area where the OD1 excavation was undertaken was identified by a senior Ganggalida person as the site of the main camp in the days prior to the establishment of the mission. He recalled it as the position of a large ti-tree humpy that his mother used (Fig. 8).

This excavation was located in an open area on the northern side of the ridge just off the crest of the dune. The purpose of the excavation was to determine the nature of the subsurface deposit for a site with documented use. The only archaeological indications for this site is a sparse scatter of small shell fragments on the surface.

The slope of the dune at this point is about  $5^\circ$ . The vegetation of the area is Open Grassland, with a small grove of *Pandanus* sp. 10m to the northwest. The lagoon is about 80m to the north.

*The Deposit.* The test pit reached an average depth of 34cm with 133kg of deposit removed in 11 units (Fig. 9). The mean mass per Excavation



FIG. 12. Two senior Ganggalida men, Willie Doomadgee and Major Waldon, inspecting features of the Old Doomadgee site.

Unit (XU) was 12.1kg. The deposit consists of coarse, reddish brown sand of uniform texture throughout. The top unit contains flecks of charcoal from recent burning of the vegetation on the dune. Rootlets occur throughout with leaves and grass stems only in the top three units. The colour of the deposit is consistent throughout while the soil reaction (pH) was 7 for all units,

*Cultural material.* Only 137g or 0.1 % by weight of the deposit is cultural. Three types of cultural

material were recovered; shell, a glass fragment and a stone flake.

All the shell recovered in the excavation is *Anadara granosa*. It is concentrated in Units 2-8 (Fig. 9) and represents 96.7 % by weight of all the cultural material recovered. Sixty percent of the shell recovered comes from XU 6. The shells are highly weathered and whole shells (N=20) were recovered only from XUs 5, 6 and 7.

Whole shells from Unit 6 gave a  $^{14}\text{C}$  date of 310±80BP [Beta 28748].

A fragment of clear glass (28mm long x 9mm wide) was recovered from XU 2. It had been flaked from a larger piece of glass and had a pot-lid flake on one surface. A small quartzite flake (11.2mm long x 2.8mm wide) was recovered from XU 11.

**DISCUSSION.** The occupational evidence from this deposit is not of great antiquity. The bulk of the deposit is younger than 400BP with a terminus post quem probably in the 1930s. The cultural material in the deposit is sparse, and the shell highly weathered although less weathered than the shell from Old Doomadgee 2.

#### OLD DOOMADGEE 2 (OD2) EXCAVATION

The area where the OD 2 excavation was undertaken was identified by Ganggalida people as the site of the main camp during the time of the Mission from 1931-1936 (Fig. 10).

This excavation was located in an open area on the northern side of the ridge midway between the crest of the ridge and the lagoon, and in the shade of a grove of four small trees (*Terminalia* sp.). The site was located on the edge of the tree line with open grassland to the south and *pandanus* and *eucalyptus* open woodland to the north. The slope of the ridge is about 5°. The lagoon is about 40m to the north.

**The Deposit.** The test pit reached an average depth of 24cm with 98kg of deposit removed in 8 Units (Fig. 10). The mean mass of each XU was 12.3kg. Like OD1, the deposit consists of coarse reddish brown sand of uniform texture throughout. The top unit contains flecks of charcoal from recent burning of the vegetation on the dune. Rootlets occur throughout with leaves and grass stems restricted to the top three units. The colour of the deposit is consistent throughout. The soil reaction (pH) is 7 for all Units.

**Cultural material.** Only 228.2g or 0.2 % by weight of the deposit is cultural. Two types of cultural material were recovered; shell and metal fragments.

The shell recovered in the excavation is *Anadara granosa* and unidentifiable fragments. Shell occurs throughout the deposit (Fig. 10) and makes up 99.6 % by weight of all the cultural material recovered. Fifty-four percent of the shell recovered came from Unit 3. The shell is highly weathered and has a chalky texture. Complete valves (N=34) were recovered only from Units 1, 2, 3 and 4. A higher percentage (9% by weight) of the shell material was unidentifiable compared

with those from OD1. Small fragments of rusty metal were found in the top three units.

**DISCUSSION.** This deposit is similar to that of the Old Doomadgee 1 deposit. It is predominantly a non-cultural deposit with the inclusion of a small amount of culturally derived *Anadara granosa* shell. In this case, however, the densest concentration of shell occurs closer to the surface. No date for this deposit was obtained although the presence of iron fragments would indicate a recent, probably post-contact, date. As for Old Doomadgee 1, the condition of the shell and its position in the deposit suggests the rapid destruction and covering of shell deposits in this area.

#### THE MISSION SURVEY

The second occupational phase at Old Doomadgee relates to the establishment of the Christian Brethren Mission in 1933 identified by the remains of buildings evidenced by corrugated iron, a few post remnants, bricks and scraps of iron. A survey of the remains of the Mission site was also undertaken (Fig. 11).

Several senior Ganggalida people pointed to areas or features of significance (Fig. 12). These were then surveyed and notes and photographs were made of the remains.

**Survey Results.** The survey plan of the site is produced in Fig. 11. The following features were noted

1) the first missionary family dwelling and later the older girls dormitory: parts of the ant bed floor were visible. Sheets of corrugated iron, old kerosene tins, sheets of tin and broken bottles were evident;

2) post-school-age girls' residence: three circular depressions in the ground about 1m across. Other evidence consisted of fragments of glass, a fragment of a grindstone, bone and glass fragments and a belt buckle;

3) butcher's shop: numerous pieces of flat iron;

4) missionaries camp: gearbox, a tin drum, sheets of corrugated and flat iron, rusted tin cans, glass bottles, and three hearths signified by small mounds of ash;

5) single male missionary dwelling: a low mound of ant bed about 4m in diameter. A number of sheets of corrugated iron; and,

6) boys' dormitory: one post two metres high, one car axle, a buggy step, wire netting and strips of iron.

When this site was re-visited in 1988, none of this evidence was visible. All the tin had been re-used in the creation of the new outstation.

TABLE 2. Description and dimensions of the Bayley Point fish traps.

Feature No	Length (m)	Max. Wall width (m)	Mean Height (m)	Condition	Notes
1	75.0	0.80	0.50	Parts of the wall broken. Southern end broken down. Mangroves growing in wall.	Encrusted with oysters, linear with irregular bends. Mud substrate thicker here than with other traps. Exposed wall dark with oxidation.
2	72	1.0	0.40	Parts of the wall undercut.	"U" shaped. Oyster encrusted. Thick mud (.40m) substrate. Retains water for longest period at low tide.
3	35	0.80	0.50	Southeastern end eroded. Partly undercut. Considerably eroded in some places.	Semicircular shape with a kink in the wall. Tapers in size at northwestern end. Built on a gutter with the tidal flow draining at the peak. Exposed wall dark with oxidation.
4	35	0.70	0.40	Parts of the wall falling down.	"U" shaped. Lower levels cemented with oysters. Exposed wall dark with oxidation.
5	175	1.0	0.50	Substantially intact. Undercut in places. Small break in north wall.	"U" shaped. Lower levels cemented with oysters. Thick mud substrate.
6	35	0.80	0.30	Parts of the wall crumbling.	"W" shaped located on the boulder surface. Oyster encrustation on lower levels. Exposed wall dark with oxidation.
7	125	1.0	0.50	Water undercutting base of wall.	"U" shape heavily oyster encrusted. Retains water late in tide.
8	52	1.0	0.50	Water undercutting base of wall.	"U" shape heavily oyster encrusted

## SURVEY AREA 10

*Aboriginal (European) Name.* Gaabula (Bayley Point).

*Location.* Bayley Point is located 2km southwest of Bayley Island and 7km east of the mouth of Passmore Creek (Fig. 4).

*Environment.* Bayley Point consists of an island of land surrounded on three sides by estuarine creeks and on the fourth, by the sea. It is an inlier of Tertiary laterites (Aurukun Surface) upon which have formed shallow soils. A series of Holocene cheniers have formed to the northwest and southeast of the original inlier. Extensive salt pans and mangrove communities have formed to the northwest and extensive salt pans to the south. The undulating ridges of the lateritic inlier are covered in *Eucalyptus polycarpa*-*Acacia hammondii*-*Petalostigma pubescens* (Grey Bloodwood-Wattle-Quinine Bush) shrub woodland. The Bloodwood trees grow to some 10m in height and have a dense shrubby understorey to 4m as follows:

*Acacia hammondii* (Wattle), (co-dominant); *Petalostigma pubescens* (Quinine Bush), (co-dominant); *Phyllanthus fuernrohrii*, (relatively common); *Terminalia canescens*, (scattered); *Acacia umbellata*, (scattered); *Melaleuca viridiflora* (as Paperbark); *Hakea arborescens*; *CoelospERMUM reticulatum* (one only); *Marsdenia* sp. (a vine). Grass covered some 30% of the ground surface, the remainder being covered with lateritic concretions.

The Holocene cheniers support a floristic and structural continuum of vegetation encompassing areas of grassland, low open woodland and woodland. To the northeast of the lateritic inlier, low sandy dunes (local relief < 1.5m) are covered in grassland and low open woodland of mixed species; the tallest stratum includes: *Canarium australianum*, (dominant); *Terminalia subacroptera* 6m, (common); *Clerodendrum floribundum*, (uncommon); *Diospyros ferrea* var. *geminata*, (uncommon); *Eucalyptus tessellaris* (Moreton Bay Ash), (found only on higher dunes). There is no significant shrub layer although *Securinega melanthesoides* and *Celtis philippinensis* are frequent.

Grasses and other ground plants cover some 60% of the surface area and include: *Heteropogon triticeus*, (dominant); Indeterminate species, (common); *Spinifex longifolius*, (common); *Trichodesma zeylanicum*; *Aristida brownii*; *Passiflora foetida* (a vine).

Due north of the lateritic inlier, undulating sandy ridges (local relief 2-3m) support *Eucalyptus tessellaris* (Moreton Bay Ash) woodland with numerous low trees and shrubs. The tallest stratum contains *Eucalyptus tessellaris* (10-20m) and widely scattered *Brachychiton diversifolium* (Kurrajong).

Numerous low trees and shrubs form an intermediate stratum up to 8m in height. These include: *Pandanus* sp. (Screw Pine), (common in places); *Canarium australianum*; *Diospyros ferrea* var. *geminata*; *Ficus opposita*; *Celtis philippinensis*; *Hakea arborescens*; *Acacia holosericea*.

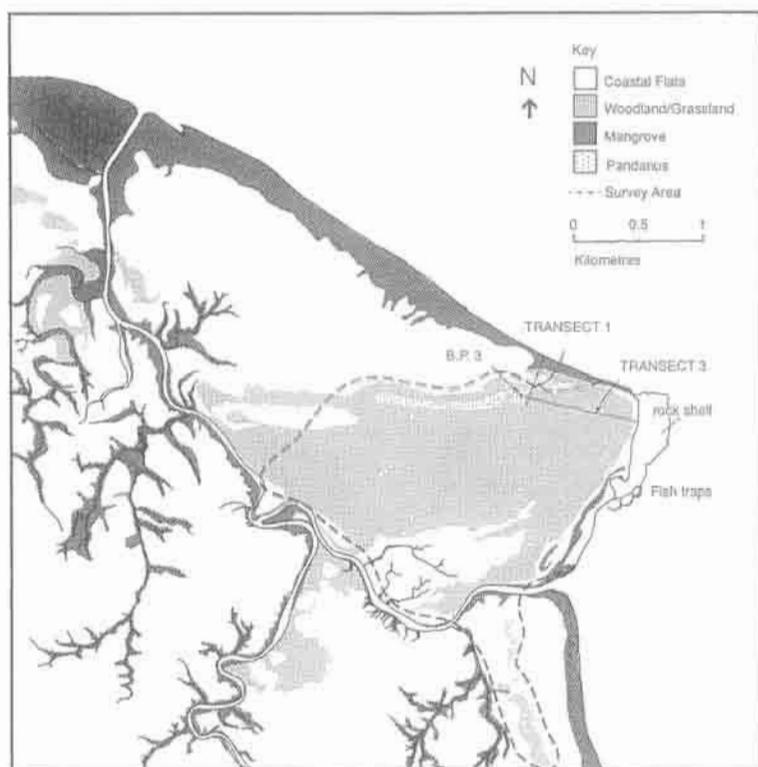


FIG. 13. Plan of Bayley Point showing location of survey area and fish traps.

Grass covers 35 % of the ground surface, the remainder is bare sand and leaf litter. *Enneapogon* sp. is one of the dominant grasses. Other plants of grass height are *Trichodesma zeylanicum* (Camel Bush), *Melhantha oblongifolia*, *Jasminum didymum*, *Breyntia oblongifolia*, and *Opilia amentacea*.

To the west and northwest of the lateritic inlier, broad flat-crested dunes support a *Eucalyptus tessellaris* (Moreton Bay Ash) woodland with numerous low trees commonly occurring in clumps. This area is floristically similar to the undulating sandy ridges north of the laterite inlier. Additional plants include: *Acacia aulacocarpa* tree, (occurring in clumps); *Ischnocarpus frutescens*, vine; *Lysiana spathulata* var. *spathulata*, vine; *Marsdenia* sp., vine; *Cassytha* sp., vine; *Santalum lanceolatum* (Sandalwood), shrub; *Gomphrena canescens*, forb; *Triumfetta appendiculata*, forb.

Extensive saline mud flats to the northwest and south are dominated by *Halosarcia* sp. and *Batis argillicola* with some *Avicennia marina* var. *australasica* (Grey (Common) Mangrove) com-

monly confined to the edges of the mud flats. The latter vary in height from 0.3-2m and 5m, expressing respectively the shrub and tree form of this variety. Around the mud flats and elsewhere on Bayley "Island" there are further elongate stands of mangrove attaining 10m in height and occasionally more. The mangrove species present include *Avicennia marina* var. *australasica*, *Ceriops tagal*, *Bruguiera exaristata*, *Aegiceras corniculatum* and *Excoecaria agallocha*.

**Ethnographic Significance.** Said to be a place with fairly constant occupation - i.e. on the "island" generally. People would travel, but return to their home here. Water was obtained from wells or the inter-chenier swales. People would camp on the beach during the dry season, but during the wet, the saltwater would be rough, there was too much wind and it was suggested that this made it more difficult to use the fish traps. The people here were distinguished particularly as belonging to "beach side". The area is tied into a Dugong dreaming myth, a focal site for which is Bijarranda, to the southwest.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 4km<sup>2</sup> (Fig. 13).

*Site Description.* The archaeological evidence at Gaabula was assessed during two surveys. The first, undertaken in 1983, concentrated on a survey of the fish traps and a general reconnaissance of the major environments at Gaabula and of the cheniers to the east (Fig. 13). In the 1988 survey, a test excavation and some geomorphic reconnaissance was undertaken on the dunes to the north of the outlier.

*Fish Traps.* This survey was undertaken to obtain accurate details of the construction, extent, and condition of the traps, and was made with a Tacheometer. One station was established on the shell ridge and a series of radial shots made to the top and base



FIG. 14. Plan of Bayley Point fish traps.

of points along the walls and to other topographic features. Notes on the width, height, construction, substrate, relationship to natural features and condition of each feature were made and colour and B&W photographs taken.

*Site Description.* The fish traps are situated on an extensive laterite rock shelf on the northeast tip of Bayley Point. The rockshelf is strewn with rock rubble and in places is covered with up to 40cm of mud. Patchy mangrove communities grow on the shelf. To the southwest of the traps a point bar has formed a shelly ridge and beach. To the east and southeast extensive mangrove communities are growing on a muddy substrate. Behind these environments are a series of small ridges with grass and shrubs graduating to a low rise with open woodland.

There are eight distinct traps making a total wall length of 604m (Fig. 14). Individual features range from 35-175m in length. Descriptions of these are given in Table 2. Maximum and minimum distances from the shoreline (assessed as the high water mark) for trap walls ranged from 10-130m (Figs 14 & 15). All the traps were constructed from laterite rocks in the immediate vicinity, and range from 5-30cm in diameter.

There are two distinct series of traps. An inner series is identifiable by the darker rock colouring due to greater oxidation, their smaller size, less oyster encrustation and their eroded and weathered condition (Fig. 16). This inner series of walls (labelled numbers 1, 3, 4, 6) has a combined length of 180m. An outer series (labelled numbers 2, 5, 7, 8) overlaps the inner series to the north but extends further south. There are three interlinked traps and one separate trap with a total wall length of 424m. These are identifiable by their U-shape, the fresh appearance of the rock, the integrity of the wall and their heavy encrustation with oyster growth (Fig. 17).

Two of the traps appear to have been constructed to take advantage of natural features. Trap number 3 is constructed over a gutter and trap 6 appears to take advantage of natural contours. All the traps are covered at high water and all drain at low water (Figs 16 & 17).

The condition of the traps varies considerably. Traps 2, 5, 7 and 8 are all heavily encrusted with oyster shells (Fig. 17). The shell cements some rocks together, but also lever others apart. The oyster growths explain the better preserved condition of the seaward traps, which are inundated for longer periods than the inner ones. It also accounts for the greater width of these walls. Parts of the base of the inner walls are also cemented with oysters, but not to the same degree as with

the outer traps. In parts, large sections of these walls are eroding or have crumbled. The base of the outer walls are eroded by water scouring out the mud and removing the smaller rocks as the tide ebbs and flows.

These traps are important for Ganggalida people. While senior Ganggalida people talk of the human maintenance of the traps, there is also a totemic dimension attributed to their origin. The rocks which the traps are constructed from, are said to have resulted from the flesh of a Dugong dreaming and came from Bijarrbanda located some 17km inland. The rocks were distributed over the landscape as the dreaming travelled down a creek, through Bayley Point, out to the offshore islands and eventually through the sea westwards at least as far as Yanyula country in the vicinity of the Sir Edward Pellew Islands. The myth recounts how the dreaming was speared by people along the way after it left the inland site, and also how its flesh (now present as rocks) was consequently strewn across the landscape in the course of being treated haphazardly by those people. This account apparently allows for human agency having constructed the traps from these rocks; however, the recounting of the myth seemingly also at times conflates this agency with that of the dreaming itself.

Ganggalida knowledge of the mainland traps is not as extensive as that held by Gayardild speaking people about the traps located on Bentinck and Sweers Islands. The traps are termed *ngurru-warr* in Gayardild. However, there appears to be no unambiguous term for them in Ganggalida. In discussing the traps, older Ganggalida people have used terms which refer to their long shape, e.g. *mundulga*. This term is apparently being used figuratively, for it translates literally as the long sinew or tendon found in parts of the bodies of animals. The example commonly given is the Achilles tendon in humans. Another expression refers to their trapping function, e.g. 'They used to put 'im that *guwarra* for *bijarrba* [dugong], *ya-guli* [fish] and *bangara* [sea turtle]', *guwarra* being a term for 'put[ting] right round something', i.e. tying up (cf. Keen, 1983: 275).

Apart from these marine foods, crabs were obtained from within the crevices of the rock walls, and oysters from on the rocks themselves. Means of obtaining fish, stingrays and crabs from the traps are said to have included walking along the walls with a spear as the tide receded, and also walking through the water as it became shallow. Contemporary old people demonstrated use of a freshwater well approximately 1km inland from

the Bayley Point traps which they say was commonly used as a camping place. In the Point Parker area a major freshwater spring similarly exists about 3km south from the location of the traps, but close to the beach. People are said to have camped on the beach in the dry season, but to have sought shelter further inland in the stormy wet season. The local land-using group in the areas containing the traps (which would typically include a majority of members of the owning patriclan) are said to have exercised proprietary rights over the traps, but not in a rigidly exclusive fashion.

Limited fieldwork conducted with Gayardild people on the subject of the traps on Bentinck and Sweers Islands has produced the following information. People would regularly maintain the traps by building up the stone walls. Traps are said to have been controlled quite rigorously by local occupiers; indeed, this fact has been framed in conversations in terms of the need to be on guard against people coming and stealing fish and other foods from traps. Such individuals were referred to as *wungiji dangga*, i.e. 'stealing man'. While people would certainly travel away from traps, they have been indicated as focal points to which groups would regularly return. A number of totemic figures are said to have originally created the traps in the South Wellesley Islands.

*Other Archaeological Evidence.* A survey was undertaken to record the nature and extent of other archaeological material in the vicinity of the fish traps and to find sites that might be suitable for more detailed archaeological investigation.

Approximately 4km<sup>2</sup> was surveyed including the open woodland on lateritic soils to the west of the fish traps, the chenier systems to the south and west of the fish traps, parts of the estuary banks and the chenier system to the south of the estuary (Fig. 13).

*Survey and Excavation Results.* The 1983 survey indicated that archaeological material was con-

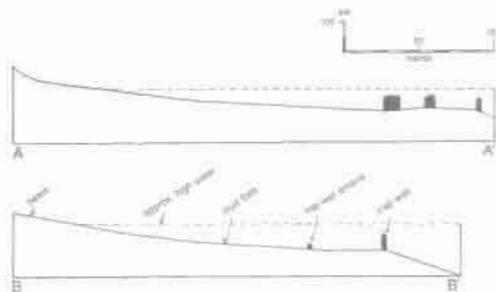


FIG. 15. Cross sections of Bayley Point fish traps.



FIG. 16. Example of inner series of traps (scale = 2m).

centrated on the chenier system to the west of the fish traps (Fig. 13). The densest concentrations of material are associated with old well sites identified by a senior Ganggalida man, up to 1.8km from the shoreline. Six low mounded shell middens, all <1m in height were identified (Fig. 18, Table 3) in this context. The predominant shell species represented in these low mounds is *Anadara granosa*, although other species are present.

The results of a transect from the middens along the crest of the chenier to the shoreline indicates that surface density of shell material in the vicinity of the mounds is high, but tapers off away from the wells and towards the shoreline (Fig. 19). Densities of 10 shells/m<sup>2</sup> commenced 700m from the shoreline and continue to 1.8km. The shell material is concentrated on the crest and slopes of the chenier ridges and very little is

found in the swales between cheniers or on the ridges near the shoreline (Figs 19 & 20). Although the predominant shellfish is *Anadara granosa*, 9 other taxa are present (Fig. 19). These occur as small clusters of one or two species. Two stone flakes, both of quartzite, were observed in the vicinity of the middens.

Three well sites are identified. These consist of shallow circular depressions of about 1m in diameter. Two are situated in the swale at the base of the northwestern slope of the first ridge and one is situated in the centre of a large depression to the southeast of this ridge (Fig. 18). A *Melo amphora* shell was found on the lip of one of the wells. Senior Ganggalida men identified these as digging tools and drinking vessels. Freshwater was obtained from Well 2 in September 1983, although it was dry in April 1988. No other surface archaeological evidence was located.



FIG. 17. Example of outer series of traps.

Of the archaeological evidence recorded at Bayley Point, the mounded shell middens offered the best opportunity for dating occupation and documenting resource use of the area. All the mounds were examined for evidence of disturbance, particularly from tree and shrub growth. Mound 3 was identified as the least disturbed and the most suitable for excavation of a test pit. The pit was placed near the highest point of the mound (Figs 21 & 22a).

#### BAYLEY POINT MOUND 3 (BP3) EXCAVATION

*Methods.* To determine the basic character of the site and to date the occupation sequence in the time available it was decided to open the site with a  $50 \times 50\text{cm}^2$  test pit. The pit was excavated in Excavation Units (XUs) defined by the amount of material removed sufficient to fill a 10L bucket

(Johnson, 1980). The pit corners reached a mean depth of 77cm. A total mass of 204kg was removed in 19 XUs (Fig. 22b). The average weight of material removed for each XU was 10.7kg. The samples were sieved through nested 2mm and 4mm mesh wire. Material in the 4mm sieve was sorted on site. All non-*Anadara* shell material was retained for later sorting. The *Anadara* shell was weighed with a spring balance and a grab sample of between 600-700g retained. All the material in the 2mm sieve and a 1kg grab sample of the material that passed through this sieve were bagged and kept for later analysis.

A 2.5m-deep auger hole was made in the bottom of the pit, and a 3.5m-deep reference auger hole was made 4m to the east of the mound centre (Figs 21 & 22a). These were drilled to determine the character and history of the ridge on which the mound had formed.

TABLE 3. Descriptions of Bayley Point mounded shell middens.

No.	Location	Max. L. (m)	Max. W. (m)	Max. H. (m)	Notes
1	In the centre of the chenier crest.	10.0	5.0	0.60	Ninety-five metres north of Well No 1. Some disturbance. All <i>Anadara granosa</i>
2	On the crest and northern slope of the chenier.	23.0	17.0	0.60	Irregular shape. Two eucalyptus growing through the centre. Sixty-five metres south of Well No 2. All <i>Anadara granosa</i>
3	In the centre of the chenier crest.	10.0	5.0	0.50	Some surface disturbance. Oval shape. Seventy-five metres south of Well No 2. All <i>Anadara granosa</i>
4	North-western slope of a gully bisecting the chenier	10.0	7.0	0.50	Oval shape. Some surface disturbance. Seventy metres south of Well No 2. All <i>Anadara granosa</i>
5	On the lower northern slope of the chenier and in the gully bisecting the chenier.	50	25	1.01	Irregular, elongate shape. Some disturbance from gully erosion. Situated in a grove of Pandanus. All <i>Anadara granosa</i>
6	On centre northern slope of chenier, 50m east of other mounds.	30.0	10.0	0.50	Irregular shape. Twenty metres south of Well No 3. Some surface disturbance. Predominantly <i>Anadara granosa</i> with some <i>Placuna placenta</i>

The material retained on the 2 and 4mm sieves was washed and dried at room temperature. It was sorted into its constituent parts of shell, bone, stone artefacts, stone, pumice and gravel.

Each *Anadara* grab sample was wet sieved and air dried at room temperature. It was then sorted and divided into complete and damaged specimens. The complete specimens, both left and right valves, were weighed and measured for length and cusp height. A 10%, quartered, subsample was selected from XUs 3, 5, 16 and 17 to compare length, width, and thickness. Sawn sections were made to measure shell thickness. Notes were made on the state of preservation of the specimens.

## RESULTS

**DATING.** Four  $^{14}\text{C}$  dates were obtained on whole *Anadara* valves in good condition from XUs Surface, 2, 9, and 18 (Table 4). These dates indicate that mound formation occurred over a period of 700 years, commencing at about 1,100BP and ceasing at about 400BP. The rate of shell accumulation was greater within the lower half of the mound, or during the first 250 years of formation (Fig. 23). Shell accumulation began approximately 1,000 years after the formation of the ridge (A3) on which it is situated.

**DEPOSIT CONTENTS.** *Non-Anadara* shell. The shell

retained in the 4mm sieve was sorted into species and an unidentifiable category. Each class was then weighed. Weights were preferred to other indices due to the fact that some species of shell, particularly *Placuna placenta*, were highly fragmented, thus precluding recognition of individual specimens. This made determination of numbers impossible, although the amount of shell was significant and aided interpretation. Comparison between the *Anadara* and non-*Anadara* can only be made on the basis of weights, as

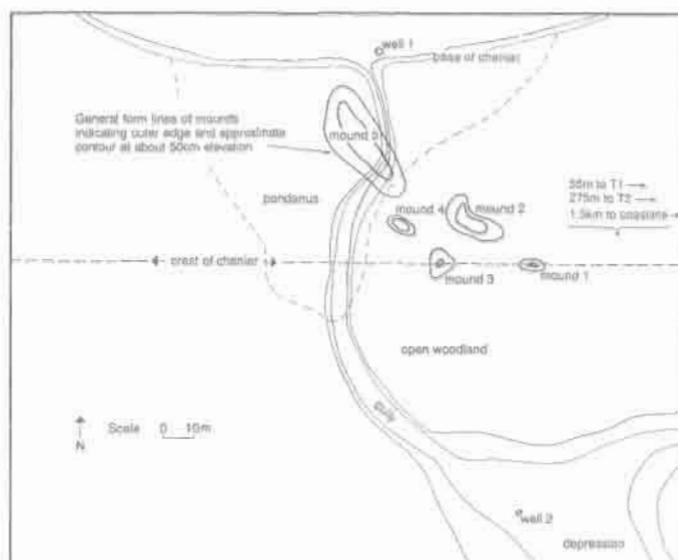


FIG. 18. Plan of mounded shell middens, Bayley Point.

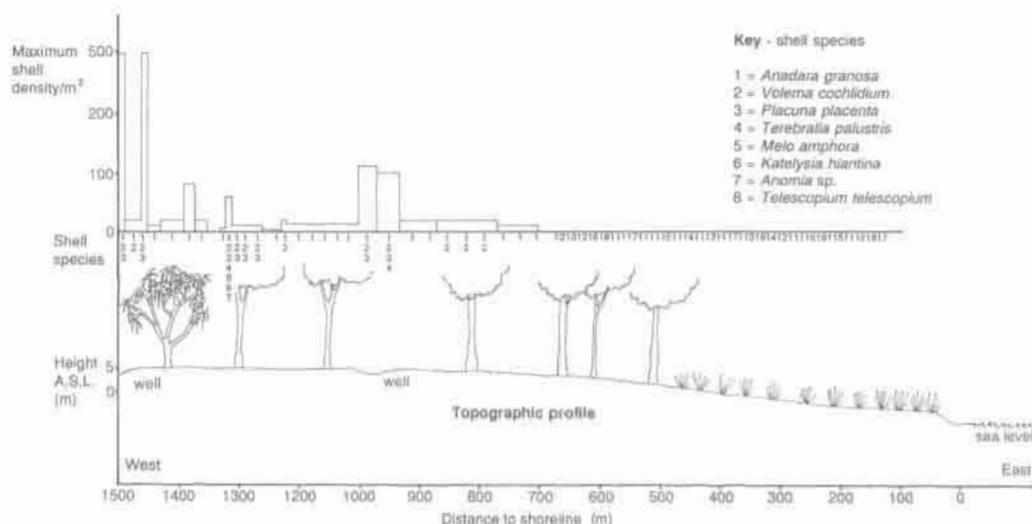


FIG. 19. Surface distribution of culturally derived shell on Transect 3, Bayley Point.

the *Anadara* shell was only weighed and not counted in the field.

Sixteen shell species were identified (Table 5). The total non-*Anadara* shell retained weighed 1,056g compared to 56,945g of *Anadara*. The non-*Anadara* species constitute between 0.004% and 7.2% (with an average of 2%) of shell by weight/XU. The species represented/XU varies between 2 and 7. From the Surface to XU 10 a mean of 3.4 species are represented; from XUs 11-18 a mean of 5.3 species are represented. Eight species occur only in XUs below Unit 11, while only two species occur only in XUs above Unit 11. No species (except *Anadara granosa*) are represented in all Units. *Volema cochlidium* is the most represented species in terms of the number of XUs (15) and total weight (626g). The representation of each species in XUs throughout the excavation varies considerably. This irregular representation of species is also reflected in the proportions of different species in each XU. Four species occur in 12 or more XUs. However, their occurrence throughout the excavation is irregular. Of the 4 species that are represented in 12 or more XUs, 3 occur at the surface and continue to XU 16, and 1, *Ostrea* sp., has 98% of its representation between XUs 7 and 18.

The percentage of unidentifiable shell is larger towards the bottom of the pit with an increase in the 4 lowest XUs. This increase can be attributed to the greater representation of less robust and

more difficult to identify species as much as to the increasing age of the shells.

*Anadara* shell. *Anadara granosa* makes up 98% by weight of all shell recovered from the 4mm sieve. To illustrate trends in size differences with depth, mass class proportions of shell have been used. Laboratory measurements have confirmed that mass is a useful measure of size, and corresponds with changes in length, width and thickness. The mass of individual specimens within XUs varies considerably throughout the excavation. On the surface the mean weight is 3.2g. In XUs 1 and 2 this rises to 3.9g and then declines to XU 7 where the mean is 2.7g. The mean weight then rises, with some minor oscillations, to XUs 17 and 18 where it is 5.2g. The variations in mass class proportions with depth are illustrated in Fig. 24. The proportion of large *Anadara* shell is higher at the base of the midden than at the top, and the proportion of small *Anadara* shell is higher at the top than at the base.

TABLE 4. Radiocarbon dates from Bayley Point 3 midden.

Excavation Unit	Depth (mm)	AgeBP	Laboratory No.
Surface	0-17	440±70	Beta 61791
2	65-97	550±70	Beta 28747
9	314-348	850±80	Beta 37835
18	724-767	1,100±70	Beta 26903

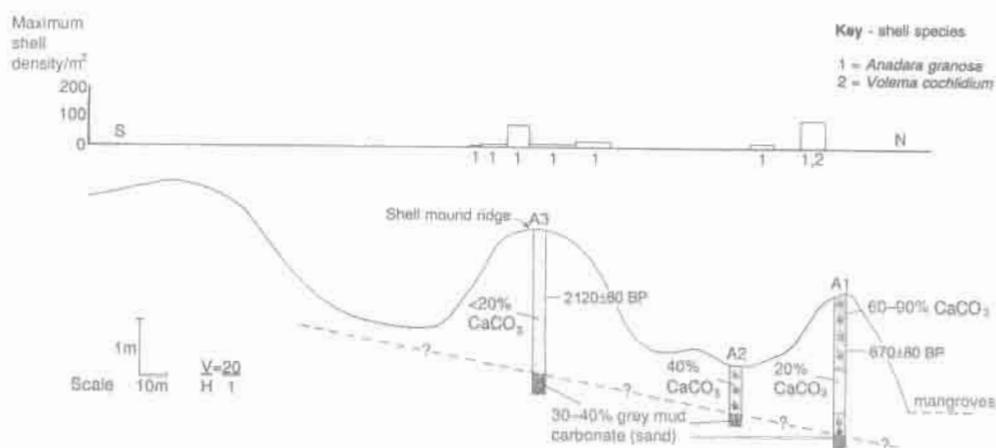


FIG. 20. Distribution of culturally derived shell and lithologies along Transect 1, Bayley Point.

However, the shell population reflected in the XUs does not show a simple relationship between midden depth and size. That is, it is not simply a

case of the larger shell occurring at the base of the midden (Fig. 25). In XU 17 the weight range includes shells <1g to 14.9g. Twenty two percent of

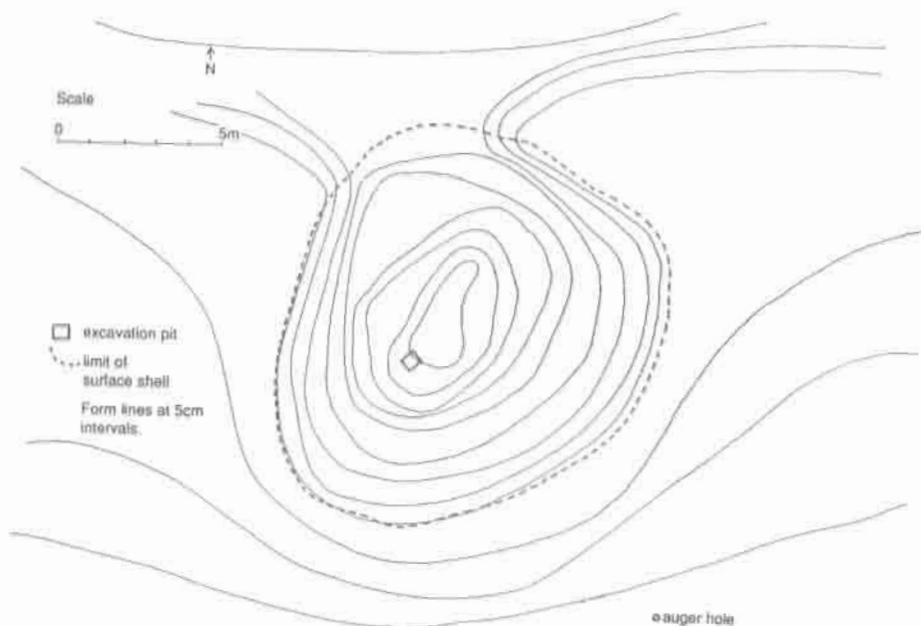


FIG. 21. Plan of Bayley Point 3 mounded shell midden showing location of excavation pit.

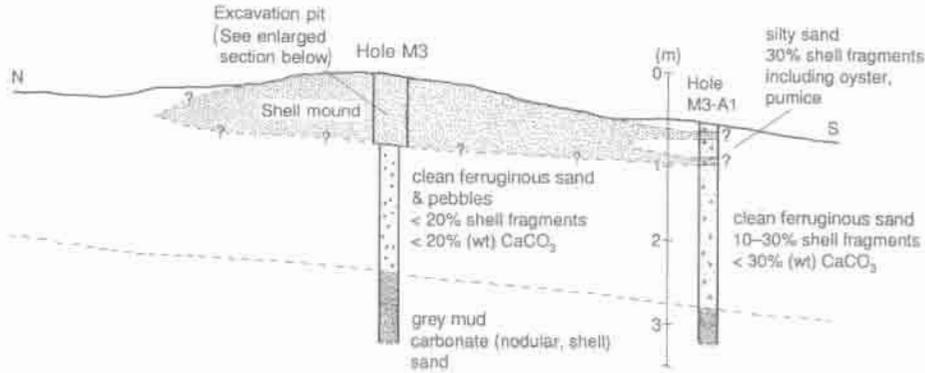


FIG. 22a. Profile of Bayley Point 3 mounded shell midden showing location of excavation pit and auger holes.

the shell fell within the 5-5.9g class. In XU 14 the weight range is similar. However, there are no longer any <1g shells and the highest percentage (31%) of heaviest shell has dropped back to the 4-4.9g class. By XU9 the weight range is 1-14gm. However, there is no <1g class and the percentages of shells represented in the 6g and greater class, has declined. The class with the highest percentage (46%) is now the 2-2.9g class. Although in XU 3 the weight range is very constricted, the shells are becoming larger again. The 3-3.9g class dominates with 41 % representation. Although the %/wt is small, large shells (10-10.9g and 14-14.9g classes) are again represented.

**Bone.** Bone remains were recovered from the washed material retained in the 2mm and 4mm sieve fractions. The total amount of bone material was 35.37g, 23% by weight of which were marine taxa and 4% terrestrial taxa. The remainder were unidentifiable fragments. The total amount of bone is equal to approximately 181g of bone/m<sup>3</sup> of deposit.

Marine vertebrate remains were found throughout the deposit (Fig. 26, Table 6). All terrestrial fauna occurs between XUs 1 and 8 (Fig. 26). Flying Fox is the most commonly represented both by numbers of elements and XUs. Small amounts of unidentifiable bone occur throughout.

**Pumice.** Small quantities of pumice occur in XUs 7-17. It varies in its representation from 0.5g to 6.6g. The pumice occurs naturally throughout the sands of the midden along with sand and shell fragments.

**Stone.** Laterite pieces recovered from the 4mm sieve were found in Units Surface to 7, 12, and 14-17. These pieces were probably not part of the chenier formation and were introduced by the Aboriginal occupants. The amount varied considerably from 128.6- 0.03g.

**Gravel.** Gravel was recovered from the 2mm sieve. It occurs throughout the deposit with the amounts substantially higher in Units 13-18. This gravel was derived originally from a laterite bedrock and it is a common chenier component. It was well rounded and heavily oxidised.

**Artefacts.** Nine stone artefacts were recovered. Artefacts included flakes, flaked pieces, a core and a

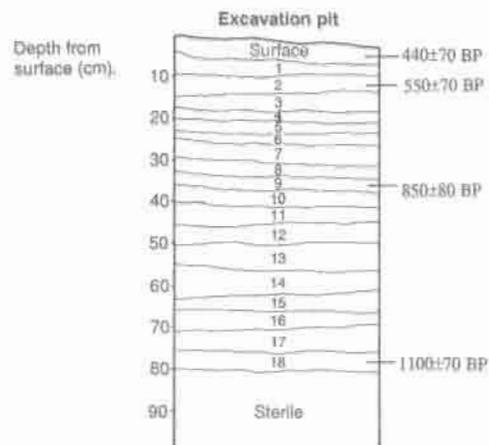


FIG. 22b. Profile of Bayley Point excavation showing excavation units and dated levels.

TABLE 5. Non-*Anadara* shellfish taxa in 4mm sieve fraction, Bayley Point 3.

Shell Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Species/XU	Total Wt (gm)/XU	Total Wt %/XU	
XU																					
Surface	69.4	1.0		3.9													0.4	4	74.7	2.2	
1	11.1			9.1		3.6												3	23.8	0.7	
2	2.8	5.6		8.8														3	17.2	0.004	
3	29.5	42.2	1.0			9.8											1.1	5	83.6	1.9	
4	42.6	28.0		2.6														1.3	4	74.5	2.2
5	4.1	0.6		1.9	1.7													4	8.3	6.2	
6	60.2			0.8														5.5	3	66.5	1.7
7	40.6	28.9	2.5		1.4							18.0						6.1	6	97.5	2.9
8	69.5			2.4														4.9	3	76.8	2.0
9	16.7	13.8	11.9	0.7	1.3													4.5	6	48.9	1.7
10	107.0	3.5	0.75															1.5	4	112.0	2.9
11	119.7	0.4	4.0	0.4	1.5								9.3					6.7	7	142.0	3.7
12	38.4	1.5	4.7		2.3	0.1		0.8		1.9								6.7	8	56.4	2.3
13	1.1	31.3	4.0											1.0				2.8	5	40.2	2.1
14		5.8	1.9	0.8			0.5								1.7			0.9	6	11.6	0.4
15			1.3	2.0			5.9	0.5										1.5	5	11.2	0.6
16	13.4	0.6	9.4	2.1			2.7									5.9		5.3	7	39.4	2.0
17			5.6			0.5	0.3	6.9	3.5	7.1	1.1							11.7	8	36.7	3.8
18			2.5						9.3		6.8							15.1	4	33.7	7.2
Total wt (gm)	626.1	163.2	49.55	35.5	8.2	14	9.4	8.2	12.8	9.0	7.9	18	9.3	1.0	1.7	5.9	76		1055.8		

KEY. 1. *Volema cochlidium*, 2. *Placuna placenta*, 3. *Ostrea* sp., 4. *Katelysia hiantina*, 5. *Nassarius olivaceus*, 6. *Anomia* sp., 7. *Cerithidea* sp., 8. *Telescopium telescopium*, 9. *Trisidos tortuosa*, 10. *Turritella* sp., 11. *Corbula* sp., 12. *Melo amphora*, 13. *Lunella cinerea*, 14. *Natica pseustes*, 15. *Murex coppingeri*, 16. *Barbatia* sp., 17. unidentifiable

fragment of a grindstone (Table 6). The artefacts are predominantly from quartzite, a raw material not occurring in the vicinity and therefore imported into the site. The source for this material may have been from near the Queensland/Northern Territory border (Tindale, 1977), though stone materials were also recorded from other inland areas (Trigger, 1987). The sandstone is also imported, although the source is unknown.

Other artefacts are made of the locally available laterite. One of the laterite flakes has evidence of abrasion, possibly indicating use as a source of ochre. One fragment of sandstone has one abraded surface with traces of ochre on it. This evidence indicates use of local stone as an ochre source.

## DISCUSSION

Bayley Point 3 is a mounded shell midden that was created by Aboriginal people between about 1,100BP and 400BP. It is situated on a chenier that had formed about 1,000 years previously (i.e. about 2,100BP), and there is a clear distinction between the deposits of the chenier and those of the midden. In common with all the recorded mounded middens it was also located in close proximity to a well. At the time of the commencement of the midden, Bayley Point was a distinct island, and the extensive salt pans and mudflats to the northwest, west and south that now exist, had not formed.

Mound generation is characterised by two distinct phases of accumulation. The earlier phase

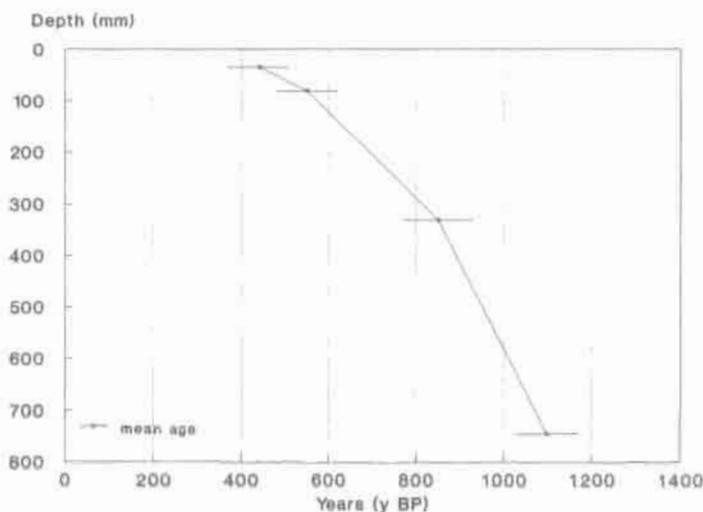


FIG. 23. Age depth curve for Bayley Point 3.

was from 1,100 to 850BP and represents the lower half of the deposit. Compared with the upper half of the deposit, it is characterised by: relatively rapid accumulation; an *Anadara* population with a broad range of shell sizes and greater mean sizes; a larger number of non-*Anadara* taxa; and an all marine vertebrate fauna. In contrast, the upper half of the midden is characterised by: accumulation over a greater length of time (400 years compared to 250 years); a smaller mean size of *Anadara* shell with a reduced size range; fewer non-*Anadara* taxa; and terrestrial vertebrate fauna complementing the marine vertebrate fauna. However, within the upper layers of the top half of the midden there is some evidence of an increase in *Anadara* shell size.

Stone (1989) argued that mounded middens are the result of the activities of scrub fowls (*Megapodius reinwardi*) who have raked up the surfaces of cheniers/beach ridges to form nests. This is not the case for BP3. The bulk of shell from the mound could not have come from the fabric of the chenier ridge as the shell component was already highly weathered before the mound was built, and is quite unlike any of the deposits in the mound. Samples from Auger hole M3, indicate that not only were many of the shells highly weathered and fragmented, the shell taxa represented (*Anadara granosa*, *Paphies elongata*, *Macra* sp., *Corbula* sp., *Macra queenslandica*, *Circe* sp., *Clypeomorus brevis*, *Codakia* cf. *pisidium*, *Glycymeris persimilis*, Veneridae sp.) were fewer in number, and, with the exception of *Ana-*

*dara granosa*, not the same as those represented in the mounded midden.

The shell in the mound was also unlike any of the shell found in the outer chenier. Samples taken from both the auger hole BPT1/A1 and the surface indicate that the chenier shell is highly fragmented, weathered and many valves contain evidence of marine borer activity. The high degree of fragmentation cannot be attributed solely to the use of the auger, as much of the fragmentation did not appear to be fresh, and the condition of the shell recovered from the hole closely resembled the appearance of the shell found in exposed sections

of the chenier. More shellfish taxa (*Nassarius dorsatus*, *Isanda coronata*, *Thalotia* sp., *Neritina violacea*, *Corbula fortiscula*, Veneridae sp., *Circe tumefacta*, *Clypeomorus* sp., aff. *Royella* sp., *Cerithidea* sp., *Bittium* sp., *Arca navicularis*, *Corbula hydropica*, *Placamentaria*, *Anadara granosa*, *Pitar* sp., Glossidae sp., *Clypeomorus brevis*, *Macra* sp. *Spisula colganæ*, *Mytilus* sp., *Corbula crassa*, *Spisula trigonella*, *Circe sulcata*, *Gafrarium catillus*, *Pitar regularis*, *Bembicium auratum*, *Macra queenslandica*) were found in the chenier than in the mounded midden; 28 compared with 16. Of the taxa represented in the chenier, only three were also represented in the midden. Many of the taxa represented in the chenier were of a size smaller than those represented in the midden and some species were represented by both adults and juveniles. At least one rare species (*Pitar regularis*) which grows in water at depths of up to 50m was recorded from this auger hole (T. Whitehead, pers. comm.).

The difference in taxa represented in the midden compared to those of the cheniers; the clear distinction between the character of the chenier deposit and that of midden deposit; the predominance of *Anadara* in the midden; the good condition of the midden shell compared with that of the chenier shell; and the inclusion of artefacts and non-shell faunal remains in the midden; precludes the possibility that BP3 is the result of scrub fowls raking up chenier deposits to form a mound.

TABLE 6. Identified non-Molluscan faunal remains from Bayley Point 3

Excavation Unit	Marine (No of Elements)	Terrestrial (No of Elements)
Surface	-	-
1	<i>Arius</i> sp. (2)	<i>Trichosurus</i> sp. or <i>Pteropus</i> sp. (1)
2	<i>Sillago analis</i> (1) <i>Eleutheronema tetractylum</i> (1)	<i>Pteropus</i> sp. (1)
3	-	<i>Pteropus</i> sp. (1)
4	-	-
5	<i>Arius</i> sp. (6)	<i>Pteropus</i> sp. (1) Agamidae (1) <i>Pteropus alecto</i> (1)
6	Elasmobranch (1)	-
7	-	Elapidae (1)
8	Brachyura (1)	<i>Pteropus alecto</i> (1)
9	-	-
10	<i>Arius</i> sp. (2)	-
11	<i>Arius</i> sp. (1) Elasmobranch (1)	-
12	Elasmobranch (1)	-
13	<i>Arius</i> sp. (1)	-
14	<i>Arius</i> sp. (2)	-
15	-	-
16	<i>Sillago analis</i> (1)	-
17	-	-
18	-	-

*Arius* sp. = Catfish, *Pteropus* sp. = Flying Fox, *Sillago analis* = Whiting, *Pteropus alecto* = Flying Fox, Elasmobranch = Shark or Ray, Agamid = Dragon Lizard, *Eleutheronema tetractylum* = Blue Threadfish, Elapid = Front Fanged Snake, Brachyura = Crab, *Trichosurus* sp. = Brushtail Possum

An alternative explanation for the mounding is that it is the result of scrubfowls raking up midden scatters from a much wider area. However, this also is an unlikely explanation. Scrub fowls build their mounds in dense vegetation, usually vine forests (Mitchell, 1993). This type of vegetation does not currently exist at Bayley Point, and is unlikely have done so in the past due to the thin, nutrient-deficient soils of the Tertiary outlier. Scrubfowls build nests with sufficient organic matter to generate the heat needed to incubate the eggs. This midden is largely comprised of shell and sand and does not have a high organic-matter content. The faunal analysis and the sequence of dates indicates that the mound has a degree of integrity that is not consistent with the constant reworking of shell expected of the nesting activities of a scrubfowl (Mitchell, 1993). The presence of a number of hinged *Anadara* shells reinforces this impression. Also absent are fragments of bird shell that indicate nesting activity (Sullivan &

O'Connor, 1993). Furthermore, the proximity of mounded middens to wells is more parsimoniously explained by invoking human, rather than avian, causes.

Although this midden does not have obvious, well-differentiated strata, analysis of its contents indicates a pattern of formation that provides clues to the relationship between a changing environment and the human responses to those changes. At the time of the formation of the midden, the shoreline was directly to the west of the site. People exploited a relatively broad range of shellfish taxa, concentrating on *Anadara*. The *Anadara* exploited were relatively large, although shells representing a broad size range were also selected. Over the period of the first 250 years of accumulation, the size range as well as the mean size of *Anadara*, diminished. The diminution in the size of the *Anadara* was accompanied by a reduction in the range of other shell-

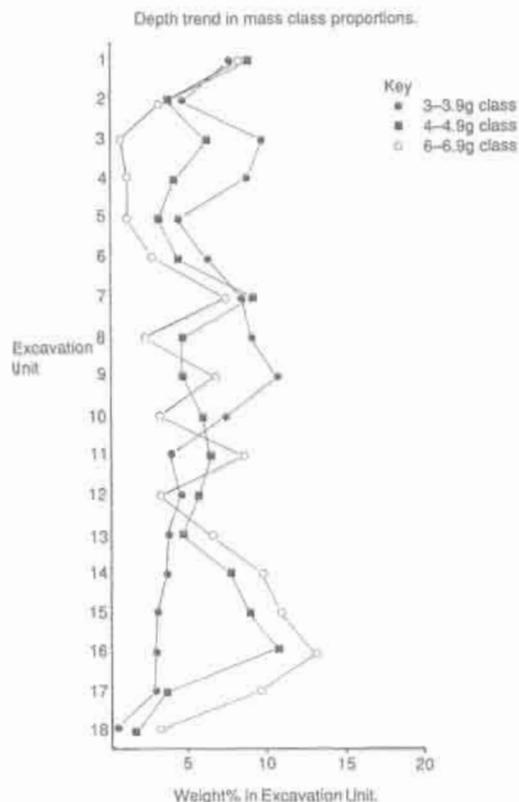


FIG. 24. Depth trend in mass class proportions for *Anadara granosa*, Bayley Point 3.

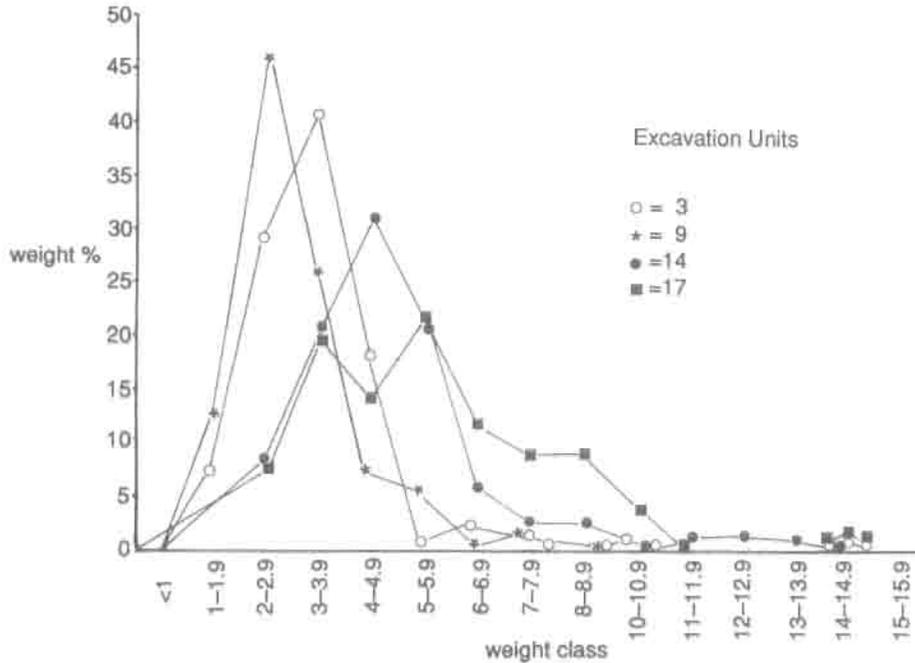


FIG. 25. Characteristics of *Anadara* population in Bayley Point 3.

fish taxa represented. At the point where the mean *Anadara* size is at its smallest, terrestrial vertebrate fauna were introduced into the site.

This trend can be interpreted as an indication of environmental stress. However, discriminating between stress induced by environmental change and that by human over-exploitation is difficult — the data are limited, and the two forms of stress may not be mutually exclusive. Due to its immobility, its attachment to the substrate and its accessibility, Oyster may be a good indicator of stress through human predation (Poiner & Catterall 1988). That is to say, if over exploitation of shellfish were occurring, oyster would be amongst the first taxa affected. This would particularly be the case if the oysters came from the rockshelves near the fish trap, and not mangroves which are more susceptible to environmental change. In this midden, the near absence of oyster after XU 9 is co-incident with the smallest mean size of *Anadara* and the inclusion of terrestrial fauna, and therefore offers some support for an interpretation of stress induced by over-exploitation. However, further investigation is required. The sample size, both in terms of the area of the midden excavated and the representation of oyster is small. In addition, the formation of the

outer chenier at about this time, (approximately 700 BP) indicates significant environmental change, raising the possibility of environmental stress on the shellfish population causing or exacerbating, any human-induced stress.

#### SURVEY AREA 11

*European Name.* Point Parker.

*Location.* 6km west of Allen Island (Fig. 4).

*Environment.* Point Parker has formed on the laterite bedrock of the Tertiary Aurukun surface. A series of distinct, broad parallel and sub parallel chenier/beach ridges have formed over the bedrock. The ridges are broad and distinct, and extensive lagoons form in the swale areas. South of the headland they trend north-south, but wrap around the outcropping laterite and continue in an east-west direction. Extensive saline flats lie behind the dunes. The shoreline graduates from a sandy shelly beach with spinifex vegetation encroaching on the upper littoral to a benched laterite rock platform covered with up to 50cm layer of muddy sand and laterite rubble. The platforms are littered with laterite boulders, some up to 1.0m in diameter. Small mangroves grow on the

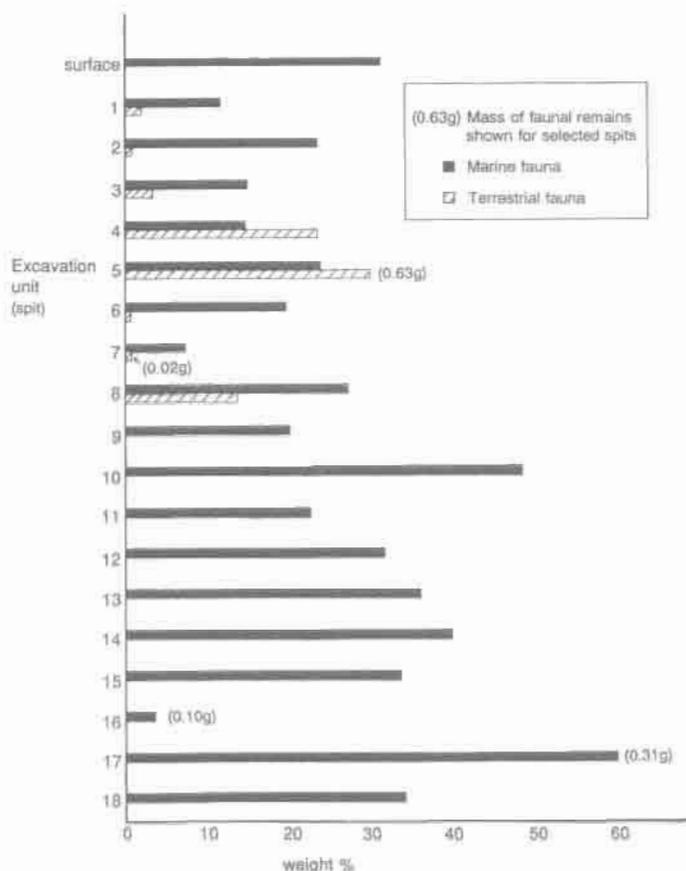


FIG. 26. Proportions of identifiable marine and terrestrial remains per Excavation Unit for Bayley Point 3.

rocky substrate. At low water this rock platform extends up to 1km seawards.

On Point Parker's northern edge there is a stand of *Lumnitzera* sp. (Mangrove) in excess of 10m with *Bruguiera exaristata* (Mangrove) and *Cyperus javanicus* in the understorey. The trees *Parkinsonia aculeata* and *Thespesia populneoides*, grow in adjacent open areas. *Colubrina asiatica* rambles over the *Parkinsonia* species.

To the south of this dark forest lie a series of ridges and swales, one containing a large ephemeral freshwater lagoon. The ridges and depressions attain a maximum width of approximately 40m. The ridges are typically very open and sandy with lateritic concretions and shelly fragments to varying degrees. Bare ground constitutes up to 90 % of the surface area. There are numerous scattered trees but few shrubs includ-

ing: *Canarium australianum*, *Diospyros ferrea* var. *humilis*, *Terminalia subacroptera*, *Pandanus* sp. (Screw Pine), *Celtis philippinensis*, *Ficus opposita* var. *micrantha* (Sandpaper Fig), *Parkinsonia aculeata*, *Securinega melanthesoides*, and *Grewia retusifolia* (Turkey Bush). Pure *Pandanus* sp. stands fringe the lagoon.

The ground cover of the open ridges consists of grasses (*Vetiveria elongata* and others not identified) and rambling/climbing vines (including *Vitex trifolia* and *Jasminum didymum*).

Grasses (*Vetiveria elongata* and others not identified), sedges (predominantly *Cyperus javanicus*) and other ground herbs (mostly *Phyla nodiflora* var. *longifolia* with *Centaurium erythraea* and *Crotalaria linifolia*) dominate the depressions with the mangrove *Excoecaria agallocha* recorded for the depression nearest the shore line.

At the time of recording the lagoon was dry and its surface well grassed. It had been moderately grazed by cattle and horses as well as native animals.

*Ethnographic Significance.* Said to have been visited regularly; people camping there used the traps. People would leave from here to go by raft and swimming to off-shore islands. It is also a place associated with Dingo dreaming which proceeded from inland to Mornington Island.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed* 1km<sup>2</sup> (Fig. 27).

*Site Description.* Two forms of archaeological evidence, a stone walled fish trap complex and a sparse scatter of shell were found. The fish traps at Point Parker were first described by Boyd (1896: 57) as '... a succession of walled-in paddocks of many acres in extent'. These are discussed in greater detail below.

TABLE 7. Artefacts Recovered from Bayley Point 3.

Excavation Unit	Identification	Mass (g)	Length (mm)	Width (mm)	Breadth (mm)	Raw Material	Notes
Surface	Flaked Piece Flaked Piece	0.1 0.2	15.1 13.0	4.0 6.4	2.7 3.2	Quartzite Quartzite	
5	Flake	4.00	18.8	14.5	4.6	Laterite	One abraded surface
7	Core	1.28	17.0	11.9	13.0	Laterite	?Ochre nodule
9	Snapped Flake	0.6	4.0	7.6	1.7	Quartzite	
10	Grindstone Fragment	0.3	10.1	9.2	4.7	Sandstone	Ochre adhering to abraded surface
14	Flaked Piece Flake	0.03 13.9	5.5 35.2	3.0 34.3	1.7 11.1	Quartzite Quartzite	
18	Flake	0.02	2.5	6.8	1.4	Laterite	

*Fish Traps.* The survey of the traps was undertaken in September 1983 to obtain accurate details of their construction, extent and condition. The traps were plotted using a Tacheometer. Three stations were established to obtain adequate coverage. Key features of the traps, the substrate they were situated on as well as important environ-

mental features were plotted. Extensive colour and B&W photographic coverage was made and the traps' construction, condition, size and shape were noted. Coloured and B&W oblique aerial photographs were also taken of the traps two weeks later. A survey of the adjacent mainland was made and archaeological evidence noted.

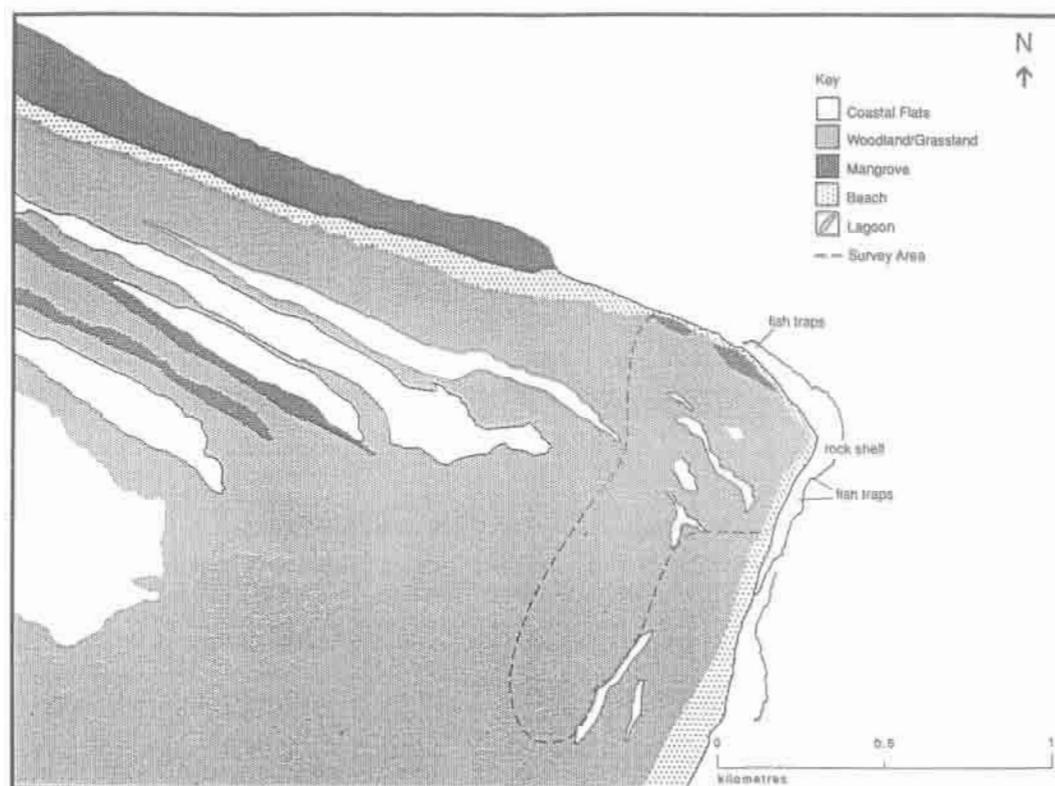


FIG. 27. Extent of archaeology survey, Point Parker.

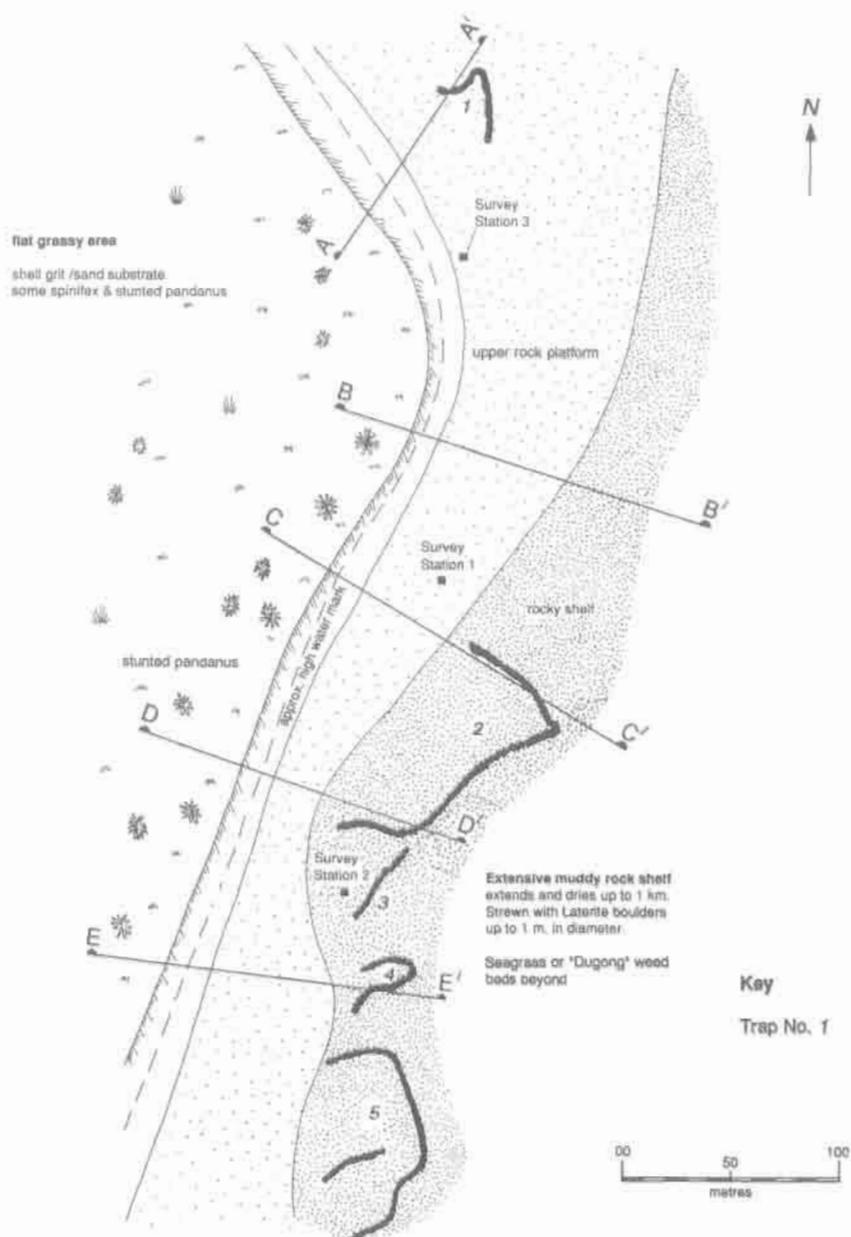


FIG. 28. Plan of Point Parker fish traps.

*Site Description.* There are 7 distinctive stone walls (Fig. 28). These form 5 separate embayments and 2 straight walls. One of the walls is within an embayment and one stands separately, although at one

time it may have abutted the adjacent embayment. The traps effectively form two separate complexes; four embayments and two straight walls are constructed on the southern side of the

TABLE 8. Description and dimensions of the Point Parker fish traps.

Feature No	Length (m)	Max. Wall Width (m)	Mean Ht. (m)	Condition	Notes
1	50.0	1.0	0.50	Broken in places. Wall eroding.	'V' shaped. Positioned between two rock outcrops. Sandy base. In places walls are up to 1.2m high.
2	195.0	2.0	0.80	Eroding. Broken in places. Some wall rocks scattered up to 4.0m	'U' shaped. Sand, mud and rubble base. Built on a gutter drawing to the eastern-most section of the trap. Walls up to 1.0m high
3	40.0	1.0	0.50	Eroding in places. Wall rocks scattered	Straight line, possibly originally part of Number 2. Sand, mud and pebble base
4	35.0	1.5	0.5	Eroding in places. Wall rocks scattered up to 2.0m	'U' shaped. Sand and rubble base. Trap construction based on small gutter. Walls up to 0.8m high
5	160.0	2.0	0.5	Eroding in places. Wall rocks scattered up to 2.0m. Indistinct in parts	'U' shape with a small length of straight wall in the centre. Possibly originally two traps. Sand, mud and rubble base. Walls up to 0.8m high

point and one embayment is formed on the northern side of the point.

A total of 480 linear metres of wall is standing. The largest continuous length of wall is 195m and the smallest 35m. A description of each is given

in Table 8. The traps appear to be constructed to take advantage of existing natural formations, to form pools or to strengthen a wall (Fig. 29). The walls are constructed from laterite boulders which range in diameter from 20cm-1m. These



FIG. 29. Example of Point Parker fish traps (scale = 2m).

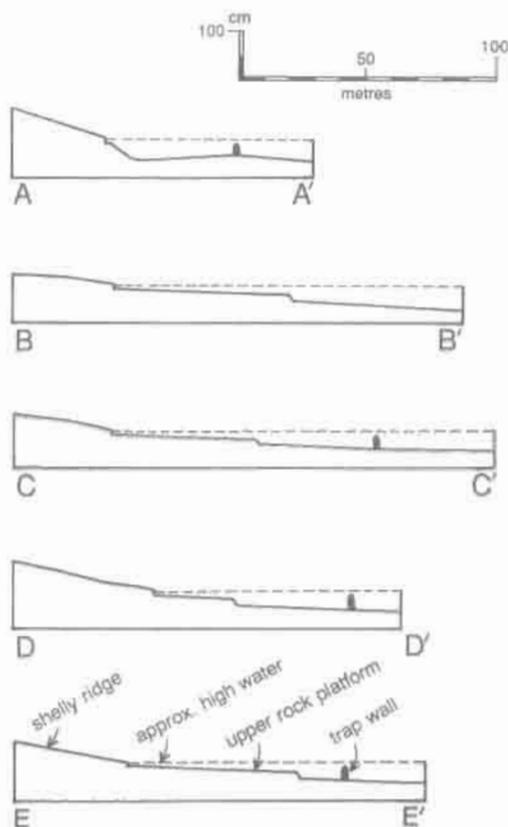


FIG. 30. Cross section of Point Parker fish traps.

boulders were obtained from the rubble on the rock shelf. There is some Oyster (*Ostrea* sp.) encrustation on the walls.

The height and width of the walls vary considerably depending upon their condition. All the walls are eroded and weathered to some degree. They vary in width from 0.5-2m and in height from 0.2m to about 1.2m (Fig. 30).

Other traps may exist to the south of the main complex, however they appear to have been heavily eroded by wave action and definitive non-continuous shapes are not readily discernible from ground level.

The only other archaeological evidence present is a very diffuse scatter of shell on the foredune. Densities vary from 1 fragment/m<sup>2</sup> to 1 fragment/50m<sup>2</sup>. Species represented are *Ostrea* sp. and *Anadara granosa*.

Lagoons provide a temporary water source. The most reliable water source in the area would

have been provided by springs at Balangayi, 3.5km to the south.

#### SURVEY AREA 12

*Aboriginal Name.* Balangayi.

*Location.* 3.5km south of Point Parker, 500m west of the coast (Fig. 4).

*Environment.* A broad shore-parallel dune with open grassland on the crest and with a permanent watercourse and spring in the eastern bordering swale. The watercourse is fringed with *Pandanus* sp. (Screw Pine) and *Melaleuca leucadendron* (as Paper Bark). Other trees associated with the spring attain unusual size for the local area. These are *Canarium australianum* (24m), *Celtis paniculata* (25m), *Terminalia subacroptera* (5.5m), and *Diospyros ferrea* var. *geminata* (6m).

The variable understorey consists of shrubs (*Securinega melanthesoides*, *Grewia retusifolia* (Turkey Bush), *Ludwigia octovalvis*, and *Melia azedarach* var. *australasica*), a flat sedge (*Cyperus javanicus*), the forb (*Phylla nodiflora* var. *longifolia*), Blady Grass (*Imperata cylindrica* var. *major*), vines (*Abrus precatorius* (Crab's Eye)), *Tinospora smilacina* and *Passiflora foetida* (Passionfruit)). Surface visibility varies from 80-100%. *Nymphaea violacea* (Water Lily) and *Polygonum attenuatum* grow in the fresh water.

*Ethnographic Significance.* This is an important camping place because of the reliability of the waterhole. However, in late 1978 it was seen in a dry condition. Water from wells would still have been available though. This site is similar to Gunamula in providing a reliable freshwater environment close to the beach.

**ARCHAEOLOGICAL EVIDENCE.** *Area Surveyed.* 1km<sup>2</sup>

*Site Description.* Extensive, continuous, but generally sparse shell scatters occur in coarse red sand along the crest and upper slopes of the dune. The shell density varies from 1/m<sup>2</sup> to 100/m<sup>2</sup>. *Anadara granosa* predominates although some *Placuna placenta* was noted. The surface of the dune had been churned by cattle.

#### SUMMARY AND DISCUSSION

The coastline of the study area is a constantly changing one, largely through progradation. From the mid-Holocene, chenier/beach ridges with associated large lagoon systems have

formed and some offshore islands have been incorporated into the mainland as ridges and mudflats have built up. Over this time, the terrestrial environment of the coastal lands generally has been one that has been increasing in area, biodiversity and richness, although at the local level these changes may have adversely affected some environments. In terms of resource availability for Aboriginal people, it is unknown whether the increasing richness of the terrestrial environment was gained at the expense of marine resources. However, as the progradation also resulted in the creation of the extensive, easily exploited salt-pans and mudflats, it is possible that access to marine resources was also improved.

Twelve areas in the study area were examined for archaeological evidence. Of these, ten have evidence of some sort; nine in the sand systems north of the salt-pans and one in the woodland plains to the south of the salt-pans.

Of the three areas surveyed on the woodland plain only one, Bundella Waterholes, contained archaeological evidence — an occasional quartzite flake exposed by erosion. Bundella Waterholes is 11 km from the coast and provides a permanent water source. The other two sites, although less distant from the coast, provide only semi-permanent water.

All the sites in the sand systems consist of shell scatters with the occasional stone artefact, two associated with stone wall fish traps.

Two of the sites in the sand systems, Bayley Point and Gunamula, have evidence of more concentrated subsurface archaeological deposits. Six Radiocarbon dates from these sites provide age determinations ranging from about 1,300BP to about 140BP. The evidence at the remainder of the sites varies in terms of their archaeological integrity from very diffuse, highly weathered and disturbed shell scatters to relatively unweathered, patchy concentrations of eroding shell. A number of sites, particularly those close to a fresh water source, have been disturbed by cattle.

Measured from the present day shoreline, the location of sites within the sand system varies from about 100m to 3.5km. Six sites are within 1km of the shoreline. Two sites extend from near the shoreline to more than 500m inland.

Three sources of fresh water are available in the sand system; wells, springs or lagoons. Of these three, wells dug to intersect the water table are the most common. Documented wells provide water at four sites and most probably at another three. Permanent springs provide a water

source for two of the sites and extensive lagoons provide seasonal water for another two. The availability of water from a particular source can vary from season to season. In some cases it is difficult to determine the precise source of fresh-water and at others water availability was unpredictable.

The shell species represented in the sites vary. *Anadara granosa* is the most common, although others, in particular *Placuna placenta*, *Katelysia hiantina*, *Telescopium telescopium*, and *Volema cochlidium* occur in more than one site. The mix of species and their relative proportions varies. In four of the surveyed areas there are small, discrete concentrations of particular species.

Stone artefacts are rare. As surface evidence they were found in only three sites, Wambalbayi, Old Doomadgee and Bayley Point. At two locations, a small number of stone artefacts were also found through excavation. The raw material for these artefacts comprise locally available laterite or imported sandstone and quartzite.

The stone wall fish traps are the most obvious form of archaeological evidence. There appears to be no strong relationship between fish traps and the distribution of other archaeological evidence. Although there is concentrated archaeological evidence at Bayley Point, it is more closely associated with wells than it is with the traps. Furthermore, there is no unequivocal evidence of fish trap use represented in other archaeological evidence. The traps at Point Parker are not associated with concentrations of other archaeological material, and Gunamula has concentrations of archaeological material, but no fish traps.

The fish traps nevertheless represent an interesting and important aspect of the archaeological record for this area. Their distribution is limited to the coastline opposite the North and South Wellesley Islands (There was no evidence of fish traps west of Bayley Point) and on those islands. They represent an aspect of shared material culture throughout this area and emphasise regional cultural similarities. The issues of similarities in the construction, use and design of these traps between cultural groups, remains however, an issue for further investigation.

The mounded middens at Bayley Point are another important piece of archaeological evidence for the region. Mounded middens are a common, and much debated archaeological feature of northern Australian coastlines. These debates concern their origins, age, role and relationship to environmental change, particularly the formation

of cheniers (e.g. Bailey, 1977, 1994; Beaton, 1985; Cribb, 1986; Stone, 1989; Mitchell, 1993; Sullivan & O'Connor, 1993; Hiscock & Mowat, 1994; O'Connor & Sullivan, 1994). Much of the debate has concentrated on the large and spectacular mounds found in Princess Charlotte Bay (Beaton, 1985), Weipa (Bailey, 1977), and Aurukun on Cape York Peninsula and in Ahnem Land (Peterson, 1973; Meehan, 1982), and distinctions have been drawn between these mounds and the 'thick, southern Australian mounds ...' (Stone, 1989: 59). Other work has, however, highlighted the variability of form, shape and content of northern Australian middens, the complex relationship they exhibit with a range of environmental factors, and similarities between the large mounds and other forms of middens (Cribb, 1986; Woodroffe et al., 1988; O'Connor & Sullivan, 1994; Hiscock & Mowat, 1994).

Clearly, the Bayley Point middens are different from the reported Cape York Peninsula shell mounds at Princess Charlotte Bay, Weipa and Aurukun (Bailey, 1977, 1994; Beaton, 1985; Cribb, 1986). The Bayley Point middens are considerably smaller, fewer in number, have a much more restricted local distribution and, to date, have been found in only one type of environment. Bayley Point 3 also does not have the shell and ashy sediment layers that Bailey (1994) observed in the Kwampter mound. However, there are a number of similarities between the Cape York mounds and BP3. The contents of all these sites consist, in overwhelming proportions, of size-selected *Anadara* shell, although small numbers of other taxa are represented. In all cases the *Anadara* shell is generally in good condition and has not fractured or cracked, indicating that it has not been subjected to the heat of campfires, either in cooking or through post-depositional heating (Robins & Stock, 1990). Small numbers of other non-molluscan faunal remains are also a shared feature. Like the Princess Charlotte Bay mounds, the BP3 deposit is largely undifferentiated, and like those sites, it is situated on a chenier. Bayley Point 3 also falls within the reported dates for the Cape sites. Beaton (1985) stated that the Princess Charlotte Bay mounds are unlikely to be older than 1,700 BP and that deposition probably ceased about 500-400 years ago. The Weipa dates for the 'Anadara economy' are from about 2,000 BP to about 400 BP (J. Beaton pers. comm.). The dates for the Kwampter mound range from 1,180±80 BP near the base to 210±110 BP near the surface (Bailey, 1977). Although further

work is required, and despite the apparent differences, the similarities between the Cape sites and those at Bayley Point, merit the suggestion that the BP3 midden represents an extension of the distribution of late Holocene, *Anadara*-dominated, mounded shell middens into the Gulf of Carpentaria. This observation raises the question 'why mound'?

The debate about mounding in the tropics has largely been dominated by observations about their location, size, economic significance and origins. The sheer number of shellfish represented indicates exploitation of a resource with some economic significance. Clearly, there must be a relationship between environmental abundance and mound formation: without large numbers of shellfish the mounds would not exist. Mounds have also been located where some environmental advantage, such as increased elevation to avoid insects, or to create the preconditions for more conducive and drier campsites, may have been gained (Sullivan & O'Connor, 1993). However, the Bayley Point middens are too small to represent a substantive base for diet, let alone an economy. Their creation produces no obvious advantage to camping conditions as the gains to height or area caused by mounding are minimal and they produce no significant changes to the environment. In fact, it can be argued that the mounding of shell creates better (i.e. shell free) camping conditions elsewhere on the chenier. Furthermore, it is difficult to see what immediate advantage accrues for people who invest in behaviour unlikely to bear dividends (i.e. improved camping conditions) for 500 years or more.

Compelling evidence from BP 3 indicates that the Bayley Point mounds were not camped on. The disintegration of shell is exacerbated by the method of food preparation. In Table 9, contemporary Ganggalida knowledge of some species recovered from surface scatters at Bayley Point are given. Of the ten species, nine were said to be used for food. Of these, seven are cooked in ashes and four are broken to get the shell out. Experimental evidence indicates that when exposed to the high temperatures of a campfire, shell can oxidise, fracture and disintegrate (Robins & Stock, 1990). The *Anadara* shell from the midden shows no indication of exposure to high temperatures. From this it can be concluded that the shell was cooked away from the mound, possibly in the manner described by Ganggalida people (see also Meehan 1982: 86), collected, and then discarded onto the mound. There is also no evidence in the form of heat affected shells or ash de-

posits, that cooking was done on the mound. The implication is that the Bayley Point mounded middens were refuse piles.

The behaviour resulting in the creation of these mounded middens stands in stark contrast to the shell discard behaviour of Ganggalida people today. While rules about the discard of some food remains exist in various parts of North Queensland, such as throwing fishbone back into the fire (Robins & Trigger, 1989) or piling discarded shell (Anderson & Robins, 1988) - and this may result in the concentration of faunal remains at some locations - no such rules generally apply to the discard of shellfish for Ganggalida people today. When one senior Ganggalida man was asked about the etiquette of discarding shellfish he replied 'You just chuck 'im anywhere', confirming observed behaviour. This behaviour applies as much to *Anadara*, which can still be easily gathered in the Gulf (and whose collection was demonstrated by senior women in 1988), as it does to other shellfish species. A plausible explanation for the mounded middens at Bayley Point arising from these observations is that mounding-discard rules applied during the period of mound formation. The cessation of mound building may have been caused by changes to the discard rules applying to shellfish, particularly *Anadara*.

Discard behaviour can also be used to explain the general paucity of shellfish remains in the archaeological record of the southern Gulf of Carpentaria. When shell is discarded over a relatively large area to form a low-density scatter it is subject to rapid weathering, disintegration, and incorporation into the fabric of the chenier/ridge. Comparison between the weathered *Anadara* shells from Old Doomadgee and the well-preserved shell from BP 3 of the same age, confirms this argument. The discard of relatively large numbers of *Anadara* at a site will not necessarily result in the formation of mounds.

Even if a mounding-discard rule for other shellfish existed, their chances of long term preservation is considerably reduced if they were cooked in a campfire. The representation of *Anadara* in these mounds as a reflection of the diet or economy of people at Bayley Point therefore, may be highly biased.

The formation of mounds requires a combination of factors which include, amongst other things, access to relatively large numbers of robust shellfish, minimal exposure to high temperature from fire, and repeated discard on the same

spot. Accretion of the shell can be caused by a location that contains the spread of the shellfish, or behaviour that dictates discard. The latter can take two forms: either the shell can be discarded onto the mound immediately after consumption or it can be raked from the chenier/ridge some time after the initial discard, and deposited into the mound. However in this environment, shell rapidly breaks down and is quickly incorporated into the fabric of the chenier/beach ridge. In these circumstances, even relatively large amounts of shell distributed on the ridge would not prove an impediment to camping. For these reasons, we are suggesting that, in the case of the Bayley Point middens, mound formation would not have occurred if discard rules had not applied.

In the absence of evidence to the contrary, the cessation of mound building may be explained by: a) local environmental perturbations destroying the *Anadara* beds or reducing numbers; (b) environmental change (progradation) requiring a shift in gathering strategies resulting in shell discard closer to the source of the shellfish beds; (c) a change in discard rules; or, d) a combination of the three.

Further work into the relationship between mounded middens and environmental change is required to clarify this situation. The subtle trends noted in BP 3 identify mounded middens as an important potential source of both environmental and cultural information.

In summary, with the exception of the stone walled fish traps and the small mounded middens, the archaeological evidence from the study area is subtle, and largely comprises surface shell scatters. On the basis of the surface evidence, there would appear to be no strong link between the ethnographically recorded behaviour and the archaeological evidence - a situation common in northern Australia (e.g. Anderson & Robins, 1988). Despite well documented evidence of people, at times considerable numbers of people, occupying the surveyed areas for extended periods of time and exploiting a range of resources, very little evidence for this occupation remains. It is unlikely, for example, that this evidence will enable detailed reconstructions of diet or economy to be undertaken.

On the other hand, the distribution of archaeological evidence attests to the extensive use of Ganggalida lands and waters over long periods of time. It also supports knowledge of links between the study area and the islands to the north and places to the west. Overall, the evidence is potentially important in providing a framework for a

TABLE 9. Aboriginal names and uses for shell species observed on Bayley Point Survey.

Specimen No.	Scientific Name	Ganggalida Name	Notes
1	<i>Anadara granosa</i>	Lalbadu	Food. Place hinge up in sand and coal pface on top
2	<i>Volema cochlidium</i>	Wulwangu	Food. Cooked in ashes, shell broken to get the meat out
3	<i>Placuna placenta</i>	mala mala	Food cooked in ashes
4	<i>Terebralia palustris</i>	Wirrua	Food. Cooked in ashes. Shell broken to get the meat out
5	<i>Melo amphora</i>	Rabunga	Food. Placed hinge up in sand and coals placed
6	<i>Katelysia hianina</i>	Bijurura	Food. Cooked in ashes
7	<i>Anomia</i> sp.	Bindili	Food. Cooked in ashes. Shell broken to get the meat out
8	<i>Telescopium telescopium</i>	Wadudu	Food. Eaten raw
9	<i>Ostrea</i> sp.	no name	Food. Cooked in ashes. Shell broken to get the meat out.
10	<i>Xanthomelon genitivum</i>	Guranda guranda	

regional archaeological and geomorphic chronology, and demonstrates the possibilities for further work in the future.

The key sites for understanding the relationship between environmental change and human occupation of the coastline will be mounded middens. These sites allow the dating of occupational sequences and their correlation with environmental change. Future work will require more intensive examination of particular areas to locate these sites. This work also needs to be integrated with geomorphological investigation both at the site and regional level. As so little is known about the ecology of this part of the Gulf of Carpentaria, such work would greatly enhance further archaeological, anthropological and geomorphological studies.

#### DEDICATION

This report is dedicated to Lizzie Daylight, Emily Ned and Willie Doomadgee; three senior Ganggalida people without whose assistance and collaboration this project would not have been possible.

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