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CHAPTER 14

ARCHAEOLOGICAL EXCAVATIONS AT GERAIN AND URAKARALTAM

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Archaeological research at a number of midden sites on the north coast of the island of Mua, Torres Strait, indicate peak levels of cultural deposition during the last 300 years. This paper reports on archaeological excavations undertaken at sites Mua 36, Mua 38 and Mua 84 at Gerain and nearby Urakaraltam. □ *Torres Strait, middens, archaeological sites, Mua.*

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From the 1 to 5 October 2002, the Mualgal (Torres Strait Islanders) Corporation, together with archaeologists from Monash University, began archaeological research in the area of Gelam's homeland (NE Mua) by visiting the legendary storyscape of the ancestral hero Gelam (see Lawrie, 1970 for details of the Gelam story). Travelling overland and by sea to Gerain, Bulbul and Usar, Mualgal representatives Whap Charlie, Fr John Manas, Roy Genai, Paul Tom, Louise Manas, David Bosun and Tommy Newie, with archaeologists Bruno David, Ian McNiven and Joe Crouch, began recording both the stories associated with individual cultural sites, and looking for archaeological sites with excavation potential. Our major archaeological aims were to investigate how long people had been living at or otherwise using individual sites and the region, and to document what kinds of cultural changes had taken place since the earliest evidence of occupation and use of this part of Mua. Our major aim was thus geared towards establishing chronological information about cultural sequences.

As things turned out, the first archaeological site we came across to this day remains the densest shell midden we have yet seen on Mua. This site was given the site number Mua 36. Other middens at Gerain were also recorded and given site numbers. Over the ensuing years, archaeological excavations were undertaken at various sites including Mua 22 (cf. chapter 10, this volume), Mua 36, Mua 38, Mua 84 and Mua 116 (cf.

chapter 17, this volume). Here we report on the archaeological excavations at sites Mua 36, Mua 38 and Mua 84. Throughout this report, we use Kala Lagaw Ya names for shellfish where known; Table 1 gives the equivalent English and scientific names.

URAKARALTAM (MUA 36)

The midden at Mua 36 is found in the area known as Urakaraltam, 'branches of the peace tree (*Hibiscus* sp.)' (Fig. 1; see also fig. 2 in chapter 1, this volume). The site is located midway along the length of a string of named villages, story places, camping sites and other significant locations that begin with the village of Totalai in the northwest, followed progressively eastward by the story place of Puapun, the beach at Baua, the historical mangrove area at Murarath, the sandy area at Urakaraltam, the point at Gerain, the long sandy area at Bulbul, and the rock-islet of Usar (Fig. 1). Midden site Mua 36 at Urakaraltam begins just a few tens of metres inland of peak high tide waters, although the seashore proper and the site are separated by a fairly thin stretch of mangrove vegetation (Fig. 2).

Mua 36 consists of a dense scatter of cultural materials dominated by *mudu* shells and numerous flaked stone artefacts on flat to gently sloping ground at the foot of the western slope of the hill of Gerain (Figs 3 & 4). The site is fronted by an ephemeral creek channel. Many of the stone artefacts are made of volcanic rock, while many

TABLE 1. Shellfish names used in this report.

Kala Lagaw Ya name	English name	Scientific name
<i>budi</i>	Nerite	<i>Nerita undata</i>
<i>silel</i>	Pipi	<i>Paphies striata</i>
<i>it</i>	Round Oyster	<i>Chama limbula</i>
<i>bu</i>	Trumpet Shell	<i>Syrinx aruanus</i>
<i>gein</i>	Rock Oyster	<i>Saccostrea cucullata</i>
<i>akul</i>	Mangrove Clam	<i>Polymesoda erosa</i>
	Chiton	<i>Polyplacophera</i>
<i>muđu</i>		<i>Anadara antiquata</i>
<i>kabar</i>	Top Shell	<i>Trochus niloticus</i>
		<i>Turbo</i> sp.

others are of quartz. One *gabagaba* fragment (reported in chapter 15, this volume), and a number of axe-head blanks are also present. The surface of the site is gravely sand; a few granite boulders occur nearby. Vegetation across most of the site is open grass and shrubs, but vine thickets grow across the western third of the main shell concentration (Fig. 5). Ground visibility in this heavily vegetated area is low (<20%) due to leaf litter, but visibility elsewhere was very good at the time of fieldwork, typically 80-95% due to a recent bushfire. The main concentration of midden deposit has a shell density of >100 shells/m². This mainly shell concentration is surrounded by a lower density scatter of cultural materials which continues for some distance to the southwest along low, sandy dune deposits. The creek flanking the

northern side of the site separates the midden from mangroves some 30-50m away (Fig. 2). A small grove of cycads occurs in the southwest corner of the site (a larger grove occurs to the southeast – Fig. 6A); this same area also has a number of large *Melaleuca* trees. A grove of *Pandanus* trees is located 10m to the south of the main midden concentration. Two large scrubfowl (*Megapodius reinwardt*) mounds are found on the other side of the creek-bed, to the northwest and west of the site. The only signs of ground disturbance within the area of the midden concentration are pig burrows (Fig. 6B) and a vehicle track that has been scraped near the base of the hill towards the site's eastern edge (Figs 6C-D). The eastern section of the main midden deposit contains a few metres where shell midden material from the site has been redeposited by machinery. The vehicle track across Mua 36 was created sometime around August 2002; no vehicle traffic came through the site before that, and the track has now been largely sealed off by the Mualgal (Torres Strait Islanders) Corporation to protect the site.

A single, 50 × 50cm square (Square K40) was positioned for archaeological excavation to the west of the track, in an area well away from any pig diggings (Fig. 6E). The datum for the site map and for the excavation was located at a high point on a low granite rock found a few tens of centimetres to the west of this square (Fig. 6F). All mapping (Fig. 6G) and excavation (Fig. 6F)

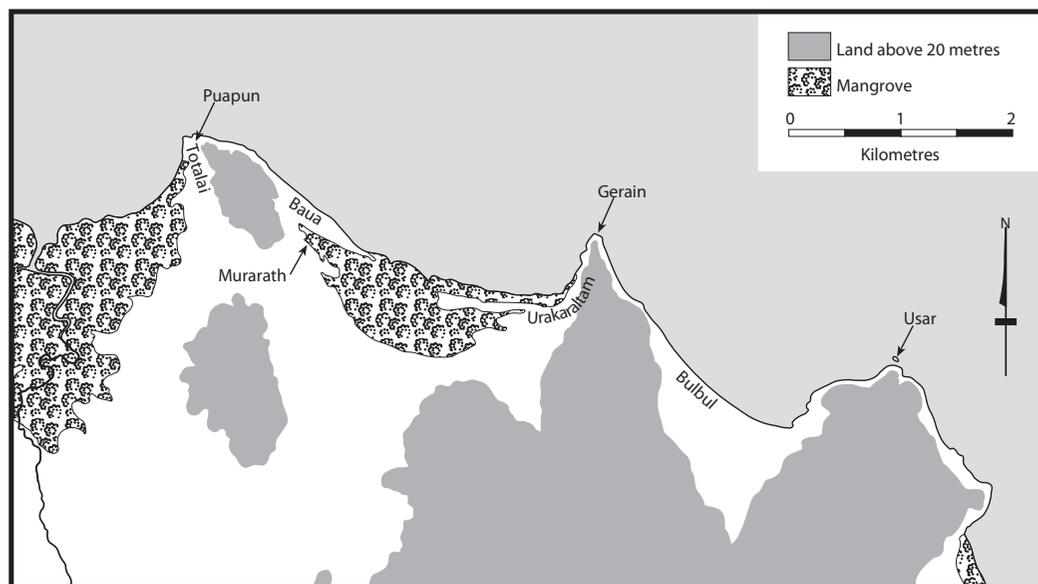


FIG. 1. Map of northeastern Mua, showing location of named places.



FIG. 2. The mangroves between Mua 36 and the seashore.



FIG. 3. Part of the site, Mua 36.

FIG. 4. Photo showing typical density of shells on the midden.

were undertaken by the field team consisting of Bruno David, Ian McNiven, Tommy Newie, Joe Crouch and Liam Brady.

THE EXCAVATION. Square K40 was excavated in 19 Excavation Units (XU) following

the stratigraphy (Figs 7-9). Excavation Units averaged 3.1cm in thickness, the entire excavation progressing down to 60cm below the ground surface. Excavated materials were sieved through 3mm mesh, the >3mm materials being

TABLE 2. Radiocarbon dates and calibrated ages, Mua 36 Square K40 (shell calibrations using Calib 5.0.2; ΔR -32 \pm 20, Sean Ulm, pers. comm., 2007; charcoal samples using atmospheric Southern Hemisphere option). * = cannot calibrate due to nuclear testing ^{14}C .

XU	Type of ^{14}C date	Depth below ground (cm)	Radiocarbon laboratory #	Material dated	$\delta^{13}C$ ‰	% Modern	Radiocarbon date (years BP)	Calibrated age AD (68.3% probability) (probability)	Calibrated age AD (95.4% probability) (probability)
1	conventional	0-1.7	Wk-11941	<i>Anadara antiquata</i>	0.7 \pm 0.2	93.3 \pm 0.4	559 \pm 37	1667-1763 (0.867) 1786-1804 (0.133)	1633-1863 (1.000)
6	conventional	11.3-13.9	Wk-16432	<i>Anadara antiquata</i>	0.8 \pm 0.2	93.6 \pm 0.5	532 \pm 42	1688-1811 (1.000)	1655-1894 (0.991) 1941-1950* (0.009)
13	AMS	31.7-33.8	Wk-11942	charcoal	-26.1 \pm 0.2	91.3 \pm 0.4	727 \pm 35	1282-1312 (0.599) 1359-1380 (0.401)	1271-1326 (0.563) 1341-1390 (0.437)
19	AMS	58.8	Wk-11943	charcoal	-25.6 \pm 0.2	84.7 \pm 0.4	1333 \pm 36	681-730 (0.569) 736-772 (0.431)	659-783 (0.901) 787-824 (0.070) 841-861 (0.029)

TABLE 3. Excavation details, Mua 36 Square K40.

XU	SU	Mean Depth Below Surface at Top (cm)	Mean Depth Below Surface at Centre (cm)	Mean Depth Below Surface at Base (cm)	Mean Thickness of XU (cm)	Area Excavated (m ²)	Volume Excavated (l)	Weight Excavated (kg)	Weight of >3mm Non-Cultural Sediments (kg)	Kg per Litre	% of Sediments >3mm (by weight)	Compaction (litres/m ³)	pH	Dry Munsell
1	1	0.0	0.9	1.7	1.7	0.25	5.0	4.5	2.5	0.9	55.6	1176	8.03	10YR 3/1 very dark gray
2	2	1.7	2.7	3.7	2.0	0.25	6.5	7.0	2.5	1.1	35.7	1300	8.05	10YR 3/1 very dark gray
3	2	3.7	5.0	6.3	2.6	0.25	8.0	10.5	4.0	1.3	38.1	1231	8.00	10YR 3/1 very dark gray
4	2	6.3	7.7	9.0	2.7	0.25	8.0	9.0	3.5	1.1	38.9	1185	7.43	10YR 3/1 very dark gray
5	2	9.0	10.2	11.3	2.3	0.25	7.0	8.0	2.5	1.1	31.3	1217	7.31	10YR 3/1 very dark gray
6	2	11.3	12.6	13.9	2.6	0.25	10.0	11.0	3.0	1.1	27.3	1538	6.82	10YR 3/1 very dark gray
7	2	13.9	15.6	17.2	3.3	0.25	8.0	10.0	3.0	1.3	30.0	970	6.65	10YR 3/1 very dark gray
8	2	17.2	18.8	20.4	3.2	0.25	9.0	10.5	2.5	1.2	23.8	1125	6.42	10YR 2/1 black
9	2	20.4	21.6	22.8	2.4	0.25	8.0	9.5	3.0	1.2	31.6	1333	6.34	10YR 2/1 black
10	2	22.8	24.3	25.7	2.9	0.25	8.0	9.5	2.0	1.2	21.0	1104	6.26	10YR 2/1 to 10YR 3/1 black to very dark gray
11	2	25.7	27.2	28.6	2.9	0.25	7.0	9.5	2.0	1.4	21.0	966	6.36	10YR 3/1 very dark gray
12	2	28.6	30.2	31.7	3.1	0.25	9.0	11.0	3.0	1.2	27.3	1161	6.31	10YR 3/1 very dark gray
13	2	31.7	32.8	33.8	2.1	0.25	7.0	8.0	2.0	1.1	25.0	1333	6.20	10YR 3/1 very dark gray
14	2	33.8	35.2	36.5	2.7	0.25	8.0	10.5	3.0	1.3	28.6	1185	6.15	10YR 3/1 very dark gray
15	2	36.5	38.4	40.3	3.8	0.25	10.0	12.0	4.0	1.2	33.3	1053	6.03	10YR 3/1 very dark gray
16	2	40.3	42.5	44.7	4.4	0.25	9.5	14.0	3.0	1.5	21.4	864	5.92	10YR 4/1 to 10YR 3/1 very dark gray to dark gray
17	2	44.7	45.9	47.0	2.3	0.25	6.5	9.3	2.0	1.4	21.5	1130	5.85	10YR 4/1 to 10YR 3/1 very dark gray to dark gray
18	2	47.0	49.9	52.8	5.8	0.25	15.5	21.1	5.0	1.4	23.7	1069	5.81	10YR 4/1 to 10YR 3/1 very dark gray to dark gray
19	2	52.8	55.8	58.8	6.0	0.25	15.5	21.8	4.5	1.4	20.6	1033	5.77	10YR 4/1 to 10YR 3/1 very dark gray to dark gray
Total					58.8		165.5	206.7	57.0					

subsequently sorted in the field laboratory established at Kubin. Sediment samples from each XU were taken from the <3mm fraction. Excavation ceased after XU19 because cultural materials ceased to be seen in situ. After sorting, however, it became apparent that sparse cultural

deposits were still present near the base of the excavation (see below for discussion).

The two Stratigraphic Units (SU) encountered consist of a thin surface layer (SU1) – loamy sand with loose leaf matter and much

cultural material – and the underlying deposits of SU2 – dark, fairly compact gravely loamy sand with numerous rootlets in the upper XUs, and with small roots occurring in places (Figs 7-9). Overall the SU2 sediments are fairly homogeneous in colour and texture across the square and with depth, but below XU6 they become slightly lighter in colour and more gravely (decomposed granite sediments; this change is very slight and while it was identified during the course of excavation, it was not pronounced enough to pick-up during section drawing). The sediments become very compact and consolidated with increasing depth.

Four radiocarbon dates have been obtained from Square K40 (Table 2). These show that the base of the excavation dates to sometime between 659 and 861 AD at 95.4% probability, and almost certainly between 659 and 783 AD. The top of the excavation dates to sometime between 1633 and 1863 AD. The fact that no European objects were found in the excavation supports the carbon dates, and together these two lines of evidence indicate that Mua 36 was last used around the time that Europeans first arrived on Mua or shortly beforehand, possibly during the early 1800s.

RESULTS. Table 3 reports on technical details of the Mua 36 excavations. Table 4 lists the contents of the excavation, and Table 5 lists all the shellfish found. Tables 6 and 7 document fish remains. It is apparent from these data that cultural materials are sparse from the base of the excavation until XU6, when large numbers of *mudu* (*Anadara antiquata*) and large amounts of dugong and/or turtle begin to be eaten. At this time also high quantities of quartz artefacts begin to be flaked and manufactured into small cutting tools, and volcanic rocks begin to be worked (see below for further details). A few *silel* (*Paphies striata*), *it* (*Chama limbula*), *budi* (*Nerita undata*) and *Turbo* sp. shellfish are also eaten after XU6, but not in large numbers. Similarly, a small number of fish were eaten during this time, likely obtained from the inter-tidal zone fronting the site adjacent to the mangroves (see below for details). The radiocarbon date on *mudu* shells from XU6 indicates that this period of intensive use of Mua 36 began sometime between 1655 and 1894 AD, most likely sometime during the 1700s.

However, there are also some cultural materials deeper in the ground. These older materials include in particular pebble hammerstones in

XU12 and XU8 (weighing 112.4g and 72.5g respectively), and small, flaked quartz artefacts. While some of the cultural materials immediately underneath XU6 can be explained by post-depositional movement of small items in sand (e.g., as people walk on the ground, pieces of stone, shell and the like lying at higher levels would have moved down by a few centimetres), this does not explain the larger items such as the two hammerstones, which could not have moved down in such a way. Nor does it explain the five small quartz artefacts in XU18 nearly 40cm below XU6. Systematic archaeological excavations at over 50 locations in sandy deposits in Western Torres Strait (cf. David & McNiven, 2005; David & Weisler, 2005) indicate that after objects were dropped on the ground cultural materials typically moved over a vertical distance of 5-15cm in such sediments, and sometimes by as much as c.20cm, but we have not yet come across any site in the region where materials can be shown to have moved vertically by any more than this. Our analyses of vertical movements in these sandy Torres Strait sites have been determined by investigating 1), the statistical spread of cultural objects down a deposit (i.e. exploring the shape of distribution curves, including at single event sites); and 2), the thickness of stratigraphic interfaces. The Mua 36 sediments are different from these other Torres Strait archaeological sites in that the Mua 36 sediments are significantly less sandy and more consolidated and compact, and therefore less conducive to vertical post-depositional movement of this kind. We therefore conclude that the pre-XU6 cultural materials at Mua 36 are largely in situ, and that people came to the site and dropped cultural materials well before 300 years ago. During these early times, they made and used small flaked quartz cutting tools. The absence of marine shell and bone remains below XU6 cannot easily be explained by in situ weathering, for the change-over to large amounts from XU6 and above is sudden, and the shells and bones present do not show evidence of rapid disintegration with depth. The stratigraphic distribution of bone in particular suggests that cultural materials have moved down the deposit by 9cm at the most (XU6 to XU9, equivalent to a depth from 14cm to 23cm below the ground) as a result of trampling and other post-depositional disturbance.

The excavated fish remains from the site suggest the exploitation of fish trapped in shallow pools during low tide. Mua 36 contains a total

TABLE 4. List of materials excavated, Mua 36 Square K40.

XU	Dugong & Turtle Bone (g)	Fish Bone (g)	Shark Teeth (#)	Shark Teeth (g)	Shark Teeth (#)	Bird Bone (#)	Bird Bone (g)	Marine Shell (g)	Char-coal (g)	Flaked Quartz Arte-fact (#)	Flaked Quartz Arte-fact (g)	Flaked Igneous Arte-fact (#)	Flaked Igneous Arte-fact (g)	Pebble Hammerstone (#)	Pebble Hammerstone (g)	Other Pebble (#)	Other Pebble (g)	Red Ochre (#)	Red Ochre (g)	Pum-ice (#)	Pum-ice (g)	Insect (g)	Land Snail (g)
1	148.79	0.1						910.55	0.92	125	96.0	5	26.5							7	3.06		0.29
2	96.41	0.1					567.91	0.06	100	71.6	3	38.9								2	0.41		0.05
3	157.16	1.0			1	0.05	660.00	0.02	130	117.8	4	6.3	1	115.8		1	9.1	1	0.32	4	0.45		0.05
4	99.00	1.1					197.23	0.16	106	60.8	8	15.8				1	5.0						
5	101.06	0.3					97.77		85	102.3	1	0.5								2	2.06		
6	84.17	0.1					19.41	0.07	62	31.9										2	0.97		
7	12.55		1	0.21					67	12.0													
8	11.89				1	0.19	0.02	0.02	41	25.5	1	0.4	1	72.5									
9	1.41								19	11.2													
10								0.39	12	1.6												0.01	
11			1	0.07				0.18	11	1.4										1	34.57		
12	0.10							0.72	10	4.0				1	112.4					2	0.72		
13								2.72	5	1.3													
14								0.50	10	1.0										1	0.67		
15									6	1.8													
16								0.04	2	0.4										1	8.56		
17	0.11							0.07												1	27.67		
18							0.17		5	2.9										2	0.60		
19								0.13	1	0.1													
Total	712.65	2.87	2	0.28	1	0.19	2453.06	6.00	797	543.4	22	88.5	3	300.6	2	14.1	1	0.32	25	79.74	0.01	0.39	

of 48 fish bones weighing 2.9g; the average weight of each bone is only 0.06g. Because of their small size, a binocular microscope at X10 magnification was necessary for examining the bones. Elements used for identification to a specific taxon in routine analysis of Pacific island assemblages frequently include the five-paired head bones (maxilla, premaxillary, dentary, articular and quadrate) and 'special bones', such as distinctive vertebrae from sharks and rays, scutes from carangids or trevallys, and grinding mills from parrotfish and wrasses. Other head bones have been used for identification (Butler, 1994) as well as otoliths (Weisler, 1993) that can increase the number of bones identified to a specific taxon. A reference collection including 389 individual specimens representing 46 families (listed in Weisler, 2001: appendix 3) facilitated identification to nearest taxon. Archaeological fish bones were quantified by both the minimum number of individual fish (MNI) present (regardless of excavation unit or XU), and by the number of identified specimens (NISP). Vertebrae were measured with calipers to two decimal places to provide an approximate indication of overall fish size. The fish analyses were undertaken by Marshall Weisler.

The fish bone assemblage was dominated by very small fragmented bones, most of which were c.5mm in size. Consequently, few bones could be identified to a specific element other than spines, rays and unspecified

TABLE 5. List of shellfish remains excavated, Mua 36 Square K40.

XU	Unidentified shell fragments	Unidentified gastropod	Polyplacophera		Nerita sp.						Large Cypraea sp.		Terebralia sulcata		
	Weight (g)	Weight (g)	MNI: # median valves (>50% length)	Weight (g)	MNI: apex	MNI: >50% posterior teeth	MNI: >50% outer lip teeth	MNI: >50% height	MNI	Weight (g)	MNI: >50% ventral surface	Weight (g)	MNI: posterior parietal	MNI	Weight (g)
1	262.89	3.3											1	1	1.28
2	148.54	0.8					3		3	1					
3	155.78	3.7			1	1	2	1	2	1.1	1	3.01			
4	34.07	2.1	1	0.29											
5	15.20	0.1													
6	0.96														
7															
8	0.02														
9															
10															
11															
12															
13															
14															
15															
16															
17															
18	0.17														
19															
Total	617.63	10.0	1	0.29	1	1	5	1	5	2.2	1	3.01	1	1	1.28

cranial fragments. Burnt bones were present in most XUs and were probably burnt by incidental exposure to hearth or earth oven cooking.

A total of eight bones were identified to the family level (Table 7). Three families (Labridae, Scaridae and Serranidae) and Elasmobranchii (sharks and rays) were inventoried. These were extremely small individuals as the diameter of 11 measurable vertebrae was only 5.16±2.58mm (range = 2.48-9.51mm). Two teeth were of the same species of shark, but definitely not the reefs sharks (Carcharhinidae) or the dog-toothed shark (Triacadae) in our reference collections. The sizes of the teeth suggest a shark of medium to large size.

Wrasses (Labridae, *Bodianus* sp.) were identified by three bones representing at least two individuals. Two left upper pharyngeal grinding plates of Labridae (*Bodianus* sp.) measured 6.50 and 7.12mm in maximum length and were from individuals with a total live length of less than 10cm. These *Bodianus* wrasses are carnivorous and inhabit lagoons and seaward reefs where they feed on invertebrates.

Parrotfish (Scaridae) are commonly found in Pacific island assemblages due, in part, to the fact that they have substantial grinding mills with dense tooth enamel that preserves in a broad range of depositional environments. Three scarid bones (MNI = 2) identified here were each represented by two fragments of a right upper pharyngeal grinding plate and a premaxillary or dentary fragment. Like the wrasses, the estimated length of these individual fish is less than 10cm.

Groupers (Serranidae) were identified from a right and left premaxillary fragment which, due to size and stratigraphic position, are likely to have come from the same very small individual (probably less than 50g in weight). Groupers can be found in tidal pools to offshore benthic habitats.

Because the average size of the fish represented in the Mua 36 assemblage is so small (all except the shark were probably less than 100g), it is likely that they were caught in shallow inshore waters where smaller fish often congregate to escape larger predatory species. Due to the lack of evidence of fishing gear in the site,

TABLE 5 (continued)

XU	<i>Polymesoda erosa</i>			<i>Anadara antiquata</i>				<i>Chama limbula</i>			<i>Paphies striata</i>				<i>Turbo</i> sp.			<i>Saccostrea cucullata</i>			
	MNI: >50% right valve umbo	MNI	Weight (g)	MNI: >50% left valve umbo	MNI: >50% right valve umbo	MNI	Weight (g)	MNI: >50% lower valve length	MNI	Weight (g)	MNI: >50% left valve umbo	MNI: >50% right valve umbo	MNI	Weight (g)	MNI: >50% operculum	MNI	Weight (g)	MNI: >50% upper valve length	MNI	Weight (g)	
1	1	1	0.75	12	12	12	624.51	1	1	9.2		1	1	0.40	1	1	0.50			7.7	
2	1	1	1.82	13	6	13	409.57					2	2	2	0.78	2	2	0.15	1	1	5.2
3				9	14	14	482.94	1	1	9.7		1		1	0.39	2	2	0.68			2.7
4				5	4	5	155.67					2	2	0.29	1	1	0.19			4.6	
5				2	2	2	82.20					1	1	0.25							
6							17.80					1	1	0.13						0.5	
7																					
8																					
9																					
10																					
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14																					
15																					
16																					
17																					
18																					
19																					
Total	2	2	2.57	41	38	46	1772.69	2	2	18.9	3	7	8	2.24	6	6	1.52	1	1	20.7	

and an absence of ethnographic evidence for net fishing, it is most likely that these small fish were taken opportunistically by hand from tidal pools isolated during periods of low tide.

Although only 48 fish bones were recovered from Square K40, 34 (70%) of the fish bones were recovered from XU3 and XU4. No other

TABLE 6. Distribution of excavated fish bone from Moa 36, Square K40.

XU	Number of fish bones
1	1
2	5
3	20
4	14
5	4
6	2
7	1
11	1
Total	48

XU had more than five fish bones. XU3 and XU4 thus represent a period of more intensive deposition of fish remains relative to the rest of the sedimentary deposit. Two matching serranid premaxillary bones from XU4 suggest that this stratigraphic level did not undergo significant mixing after deposition of these elements. However, two shark teeth from the same taxon (and perhaps from the same individual) were recovered from XU7 and XU11 (separated by 8.5cm of sediment) and may signal post-depositional downward movement from higher levels or general mixing of the matrix after deposition. This is consistent with the vertical distribution of cultural materials which had independently implied a maximum of about 9cm for observable post-depositional disturbance at this site.

It is of interest to note here that all of the scale fish bones come from the period when Mua 36 was a village, and the only two shark teeth come from a time before the commencement of the village (see below).

The volcanic stone artefacts at Mua 36 are also of particular interest, for these are made on the same kinds of raw materials as known Torres Strait stone axe-heads and *gabagaba*. McNiven & von Gnielinski (2004), and McNiven et al. (2004), have analysed in some detail Torres Strait stone axe-heads and *gabagaba* made on volcanic rock, and conclude that trade in such stone artefacts was wide-ranging in the past. Mua was part of this trade network, and the volcanic flakes excavated at Mua 36 were probably created when larger volcanic rocks were made into axes, and possibly also *gabagaba*. Evidence for partly manufactured axe-heads at various stages of manufacture on volcanic rocks have been found among the surface finds at Mua 36.

There is also a macropod (*Macropus agilis*) tooth in XU8. Macropods do not live on Mua today, nor are they known to have occurred as resident populations during the 1800s. This macropod tooth at Mua 36 dates to sometime after 1271 AD (but before 1894 AD); that is, it is less than about 730 years old, and probably more than 300 years old given the radiocarbon age probabilities. McNiven & Hitchcock (2004)

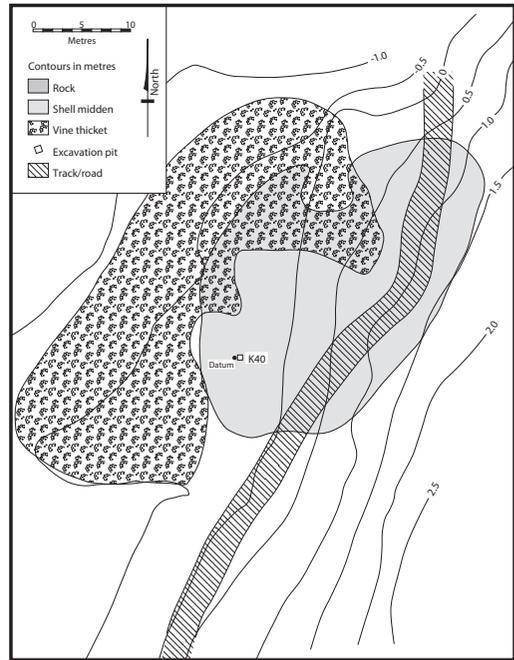


FIG. 5. Map of Mua 36.

TABLE 7. Mua 36, Square K40: fish bone analysis.

XU	Family	Genus	Element	Side	NISP	Comments
1	Labridae	Bodianus	upper pharyngeal grinding plate	left	1	6.50mm long
2	fish		?		1	
2	fish		vertebrae		4	
3	fish		various		11	
3	fish		vertebrae		7	
3	Scaridae		upper pharyngeal grinding plate	right	2	Fragments. Very small individuals
4	fish		various		7	
4	fish		vertebrae		4	2 vertebrae similar to Tetraodon
4	Labridae	Bodianus	upper pharyngeal grinding plate	left	1	7.12mm maximum length
4	Serranidae		premax	left	1	Probably same individual as below
4	Serranidae		premax	right	1	<10cm TL
5	fish		various		1	
5	fish		vertebrae		2	
5	Scaridae		dentary	right	1	
6	fish				1	
6	Labridae		premax-dent	?	1	
7	shark		tooth		1	Same taxon as tooth in XU11
11	shark		tooth		1	Same taxon as tooth in XU7
	Total				48	Average weight = 0.06g



FIG. 6. A, Cycad stand to the immediate south of Mua 36; B, Damage caused by pig rooting at Mua 36; C, The vehicle track that passes through Mua 36; D, Mua 36, discussing the location of the square prior to excavation; E, Mua 36, with Square K40 after completion of excavation; F, Mua 36, Square K40 excavation in progress; the rock immediately behind the excavation square is the datum rock; G, Mapping of the site in progress.

have recently reviewed the evidence for kangaroos and wallabies across Torres Strait in the past, concluding that:

No 19th century scientific expedition to Torres Strait recorded macropods on islands [...] Twentieth Century recordings of macropods in Torres Strait are limited to Agile Wallabies (*Macropus agilis*) on 2 small islands [Mai and Giralag].

We know also that there were imported pet macropods at St Paul's Mission during the early-to mid-1900s (see also McNiven & Hitchcock, 2004: 119), but the tooth found at Mua 36 is much older than this.

This is not the first time that macropod bones have been found in archaeological excavations on Mua. This is particularly intriguing given that no macropod bones have yet been found on any other island in Western Torres Strait, despite considerable excavations on some over the years (Badu and Mabuyag in particular). On Mua, excavations at Turao Kula (Mua 10) near the Goba site near Uma also revealed a single macropod tooth in XU4, in a level dating to shortly before AD 1458-1674 (at .908 of 2 sigma probability; see David et al., 2004a for site report). Macropod teeth were also found in

the pre-European contact sediments at Totalai (Mua 22); these are reported separately in chapter 10, this volume. And along the eastern coast of Mua, macropod teeth and other bones were found by David Harris, Anthony Barham & Barbara Ghaleb (1985) during their excavations at Middens 2 and 4 at Wag in the early 1980s; these have not yet been radiocarbon dated.

We know also that macropod teeth were used for necklaces and to decorate items of clothing by Torres Strait Islanders during the late 1800s: Haddon (1912: 35) describes coronets and necklaces made of dog and kangaroo teeth from Mabuyag, and such necklaces were valued items in exchange transactions with other Islanders, and with peoples from New Guinea and Cape York, at the time. Such items of exchange were often related to marriage ceremonies and appear to have been worn by women and young girls (Haddon, 1912; see also Vanderwal, 2004). There is also a photograph of a macropod teeth coronet in Haddon (1912: plate IX), and band patterns decorating *warup* drums on Nagi include representations of macropod teeth (Haddon, 1912: 365-366).

We do not know whether the macropod tooth found at Mua 36 represents food remains or whether it was part of a necklace or other item

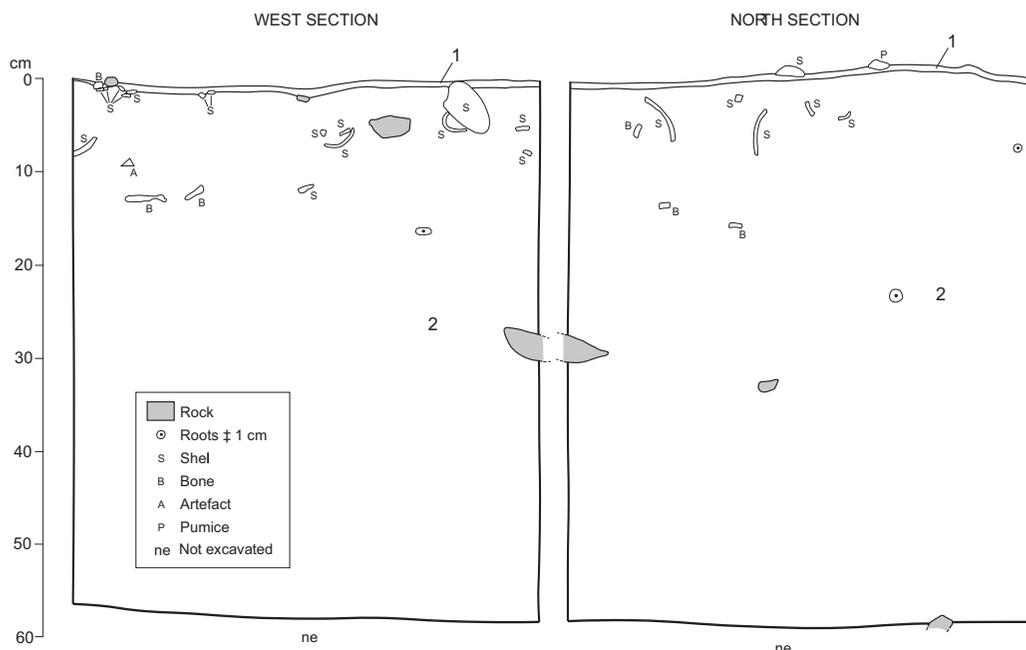


FIG. 7. Mua 36, Square K40, section drawings, west and north sections.

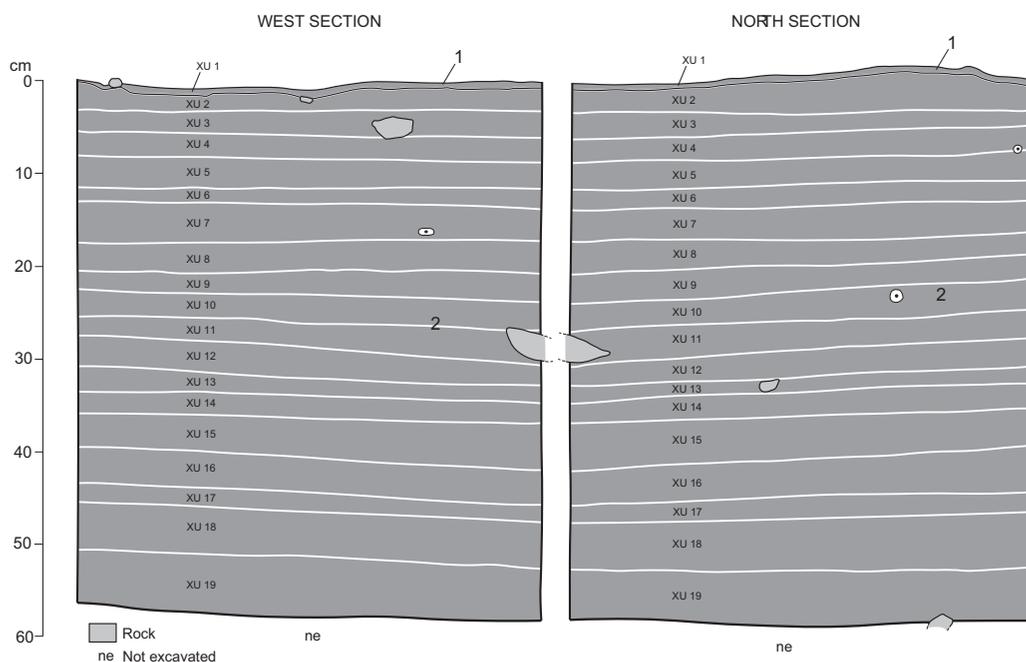


FIG. 8. Mua 36, Square K40, west and north sections with XU superimposed on the section drawings.

of material culture. Nor do we know if the animal once lived on the island, or whether it was imported during an exchange trip with other Islanders, Papuans or Aboriginal people from Cape York (see McNiven & Hitchcock, 2004, for a detailed discussion of this kind of trade involving the movement of animals across Torres Strait, southern New Guinea and Cape York during the recent past). Considerably more archaeological work is needed on Mua before this mystery of where macropods came from can be resolved.



FIG. 9. Mua 36, Square K40, the west and north walls after completion of excavation.

An intriguing aspect of the Mua 36 sediments is that in those levels well below the dense shell, bone and stone artefact layer – that is, from those levels dating to sometime before 700 years ago – there are greater amounts of charcoal than the rich cultural layer above. We do not think that this charcoal came from camp fires or *amai*, because in these lower levels there is an absence of the dense cultural deposits that we usually find with such camping activity. Rather, we think that the charcoal below XU6 largely, if not entirely, came from bush fires started by people. Mua 36 is not the first place where we find relatively high quantities of charcoal in levels beneath the archaeologically rich camping levels. We have found a similar thing on nearly every island we have worked in Torres Strait, be they large islands or islets. Repeatedly, the pattern is as follows: first, we find evidence of burning of the landscape – charcoal occurs in the sand, sometimes also with sparse evidence of camping activity. The charcoal tends to date to both before and after occasional evidence of camping. Then, usually a few hundred years later, we begin to find dense evidence of camping. So far, this dense camping evidence has tended to date to after 800-600 years ago (for examples, see McNiven, 2006). The case at Mua 36 is exactly like this.



FIG. 10. View to the west and northwest (towards Badu – here seen in the distance – and Mabuyag) from the top of the hill near Mua 36.



FIG. 11. View to the southeast (towards Bulbul and Usur) from the top of the hill near Mua 36.

We take this to mean that the vegetation at Mua 36 was thicker before XU10 (where charcoal is most common, sometime before 700 years ago). People occasionally came here and burnt the vegetation, but these fires did not entirely transform the forest into grassland. These burning events occurred a number of times. During this period of time, people occasionally and briefly camped at Mua 36, but there does not appear to have been a village there at that time.

Then, about 300 years ago, people started spending much more time at Urakaraltam. They repeatedly exploited the nearby mangroves and sandy muds for *mudu*, and they also repeatedly cooked and ate dugong and/or turtle there, sometimes in *amai* (we see hearth stones exposed on the surface at the site). Turtle and dugong are large, shared items of food. This

means that the people who came to Mua 36 did so in groups, not singly. We also think that because there are so many shells, and so much dugong and/or turtle at Mua 36 after about 300 years ago, people probably camped here for long periods of time. We suspect there were houses here or very close-by, most likely a small village, although we do not know if it was occupied year-round or during much shorter periods of the year only (e.g. seasonally). The presence of mangroves between Mua 36 and the seashore would have offered good camouflage from passing canoes, while the presence of nearby beaches would have afforded good moorage for the villagers. The environment around Mua 36 is rich in resources and diverse (including open beaches and mangroves), and a freshwater spring occurs within a few tens of metres of the site (a large seasonal freshwater swamp is also found nearby). The fact that Mua 36 contains much stone reduction material from the manufacture of axe-heads also indicates that when people came here they undertook time-consuming activities not immediately aimed at food production.

The small shell middens on the nearby hill-top – Mua 38 in particular – also help us better understand what the Mua 36 site is all about. On the hill-top immediately adjacent to, and above, Mua 36 is found a sparse scatter of shells – food remains – along with a number of old *bu* (*Syrinx aruanus*) shells, which may have been used to announce the coming of canoes towards the village. The cultural materials on the nearby hill-top are found in a location where views to Badu and Mabuyag to the west and northwest are extensive (Figs 10-11) – during early ethnographic times, and previously according to oral traditions (see Haddon, 1935 for details), Mua's mortal enemies came from Badu and Mabuyag. The presence of a lookout, and of sentinels as indicated by the *bu* shells and sparse food remains on the hill-top, indicate that there was a need for a warning system, and therefore that there were people to warn nearby (see Mua 38 results below for further details of that site). This further supports our interpretation of Mua 36 as a village after about 300 years ago.

Together, these various lines of evidence – environmental circumstances consistent with known village sites (camouflage, good moorage, varied and rich resources, freshwater sources), the presence of shared foods (dugong and/or turtle) normally cooked in *amai* (which are usually found in villages), very dense and extensive food

TABLE 8. Description of Stratigraphic Units (SU), the Mua 38 excavations.

SU	Description
Square G30	
1	Loose surface sediments. Gravely, with much decomposed granite. Recently burnt pieces of grass present at time of excavation. Very thin SU, c. 0.5cm thick. Sediments dry at time of excavation. Silty-gravely sands. Shells (mudu, <i>Anadara antiquata</i>) present. Granite rocks present.
2	Very compact and consolidated sediments, dark in colour, rocky, silty-gravely sands. Dry at time of excavation. Sediments appear to become slightly lighter in colour below XU4, and more rocky towards the base of the excavation.
Square Q30	
1	Same as for Square G30 XU1
2	Similar to SU1 (minus the burnt grass). Shells (mudu) present. Very compact and consolidated silty-gravely sands. Dry at time of excavation. In some parts of the excavation square – especially in the eastern half – large granite rocks are present, emerging from the underlying XU. The SU2 upper surface forms a sudden boundary separating it from SU1 above. Two tree roots (each 1 to 3cm in diameter) are present at the SU2-SU3 boundary.
3	Similar to SU2, but more gravely. No shells were noticed in situ. Boundary with overlying SU2 is marked, taking place over a vertical distance of less than 1cm. Large granite rocks are present.

refuse area, the manufacture and use of varied raw materials (including quartz and volcanic rocks), the presence of a lookout with sentries on the nearby hill-top – all point to the presence of a small village at Urakaraltam after about 300 years ago. This village most likely ceased to be used sometime around 200 years ago, give or take a few decades (as indicated by the radiocarbon date for XU1), for reasons we do not yet know.

MUA 38

Three-hundred metres to the northeast of Mua 36, and 70m higher, along a northern protrusion of the hill-top of Gerain, is a flattish ridge-top that measures 50m in width and 300m in length (Fig. 12). On either side of this ridge-top, the hill slopes down sharply, towards Mua 36 in the west, and towards Bulbul in the east. The northern, eastward and westward views are extensive from here, with Mabuyag and the northern part of Badu both being clearly visible



FIG. 12. The ridge-top containing Mua 38, above Mua 36.

(Figs 10-11), along with Totalai and Usar (see above). It is along this narrow ridge-top that are found the sparse shell middens of Mua 38 and Mua 39 (Fig. 13). Between these two sites is a stone arrangement in the shape of a crocodile, site Mua 37 (Figs 14-15). It is found 40m to the

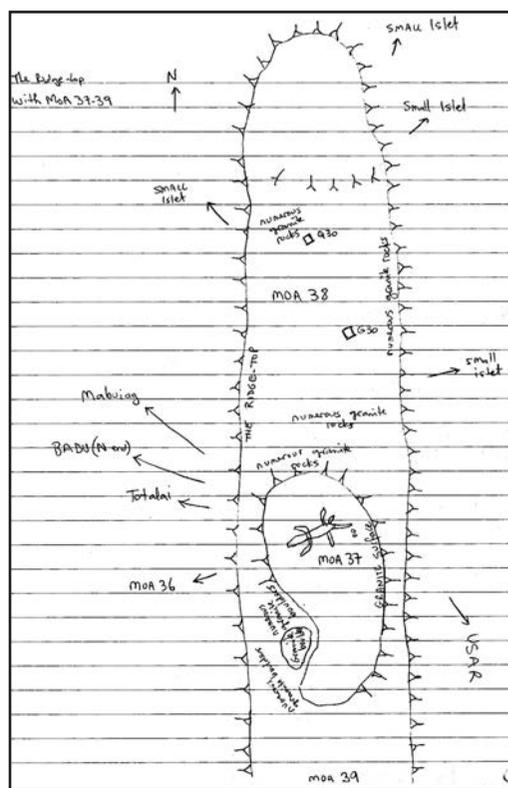


FIG. 13. Field sketch map of sites Mua 37-39 on the ridge-top above Mua 36. The locations of the two excavation squares at Mua 38 are shown.



FIG. 14. Mua 37.

south of Mua 38, and described thus in the field notebook entry for 9 October 2002:

This site consists of a stone arrangement made out of loose granite rocks, into the shape of a crocodile. The stone arrangement sits immediately onto a massive granite outcrop surface. This is a smooth, convex-curved granite surface. It is a locally high point, although about 200-300m to the south is the apex of this ridge/hill [142m above sea level]. At Mua 37 we are thus at a high point of this hill/ridge, with excellent views to Usar at 100° magnetic from the crocodile (lookout point); to Totalai 285° magnetic from the crocodile; to Mabuia 325° magnetic from the crocodile; and to Badu 290° magnetic from the crocodile. From this lookout point, we have perfect views across this entire 175° magnetic arc and more.

From the granite surface where sits the crocodile arrangement, the ridge-top extends as a narrow, flat ground surface for about 150m to the south, and 150m to the north. [...] The ridge-top slopes slightly down immediately to the north of the crocodile, flattens out again at site Mua 38, and then slopes steeply towards the sea [Gerain Point] at the end of the ridge-top flats.

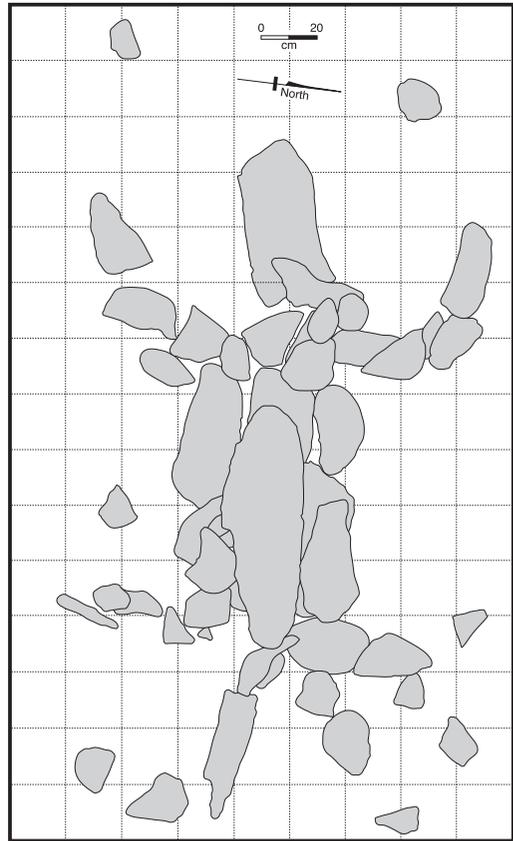


FIG. 15. Mua 37 site map.

The granite rock which has the crocodile is almost entirely bare of vegetation, except for a few tufts of grass and other small vegetation.

A few of the crocodile rocks seem to have been moved around, probably by pigs. There is a tiny amount of soft sediment build-up amongst the crocodile rock. The crocodile is itself *c.* 30cm high at highest point. The two rocks at the 'eyes' area are reddish in colour, unlike most (but not all) of the granite-grey rocks that make up this formation.

Five metres to the east of Mua 37 is a quartz vein in a granite boulder. This vein appears to have been flaked for stone artefacts, although because of subsequent weathering we cannot be certain of this. Forty metres south of the crocodile is Mua 39, a scattered shell midden, very similar in size, shell density and locational characteristic to Mua 38 (Fig. 16). Mua 39 is located on the ridge-top, also with excellent views



FIG. 16. Mua 39, looking southeast, and showing the cleared area in foreground.

out to Badu and Mabuyag, Totalai to Usar. The ground surface is gravelly, with numerous larger granite rocks and boulders. The area is sparsely grassed, with a few trees found mainly on the edge of the ridge-top. Here the ridge-top is about 20m wide; the site itself is 15m long and 15m wide. The shellfish species found here are *mudu*, *bu*, *akul*, *kabar* and *gein*. Dugong bones and quartz flaked artefacts are also present. To the southeast of Mua 39, the ridge-top slopes upwards to a local peak.

THE MUA 38 EXCAVATIONS. Mua 38 has all the hallmarks of a lookout. The flat ridge-top here is 70m long by 20m wide, and the site consists of a relatively sparse scatter of shells 30m long (north-south) by 10m wide (east-west) on a gravelly surface (Fig. 17). Occasional shells, mainly *mudu*, occur for a few metres beyond this concentration, but in such cases they are even more sparse than in the main concentration. Here the ridge is poorly grassed; some trees occur on the edge of the ridge-top. To the south of the site, granite boulders slope upwards towards Mua 37, the crocodile stone arrangement. Granite rocks and boulders occur as outcrops along the ridge-top near and around the site.

Among the cultural remains at Mua 38 are six very weathered *bu* shells. They are not clustered together, but spread roughly equidistant across the midden area. These were individually plotted on the site map, photographed, and sampled for radiocarbon dating (Figs 18, 19). We do not know if any of the *bu* shells once contained holes for blowing, for they are each now too broken to tell.



FIG. 17. Mua 38, part of the shell concentration (with *bu* shell 5 in foreground).

Two 50 × 50cm squares (G30 and Q30) were archaeologically excavated at Mua 38, to determine 1), the site's contents; and 2), its age, in particular whether or not it was contemporaneous with the settlement at Mua 36 at the base of the hill (Figs 19, 20). A number of the weathered *bu* shells found on the surface were also radiocarbon dated with this latter aim in mind.

Square G30 was located near the southern end of the site, in an area where shells were most concentrated (Figs 21A, B). Square Q30 is at

Table 9. Excavated shells, Mua 38 Squares G30 and Q30.

XU	Anadara antiquata				Trochus niloticus	
	MNI: >50% left valve umbo	MNI: >50% right valve umbo	MNI	Weight (g)	MNI: >50% diameter	Weight (g)
Square G30						
1		1	1	52.04		0.2
2	1		1	60.47		1.1
3				11.32	1	12.6
4			1	4.01		
5						
6						
Total	1	1	3	127.84	1	13.8
Square Q30						
1	5	4	5	106.35		
2	4	5	5	177.80		
3	2	4	4	42.78		
4						
Total	11	13	14	326.93		

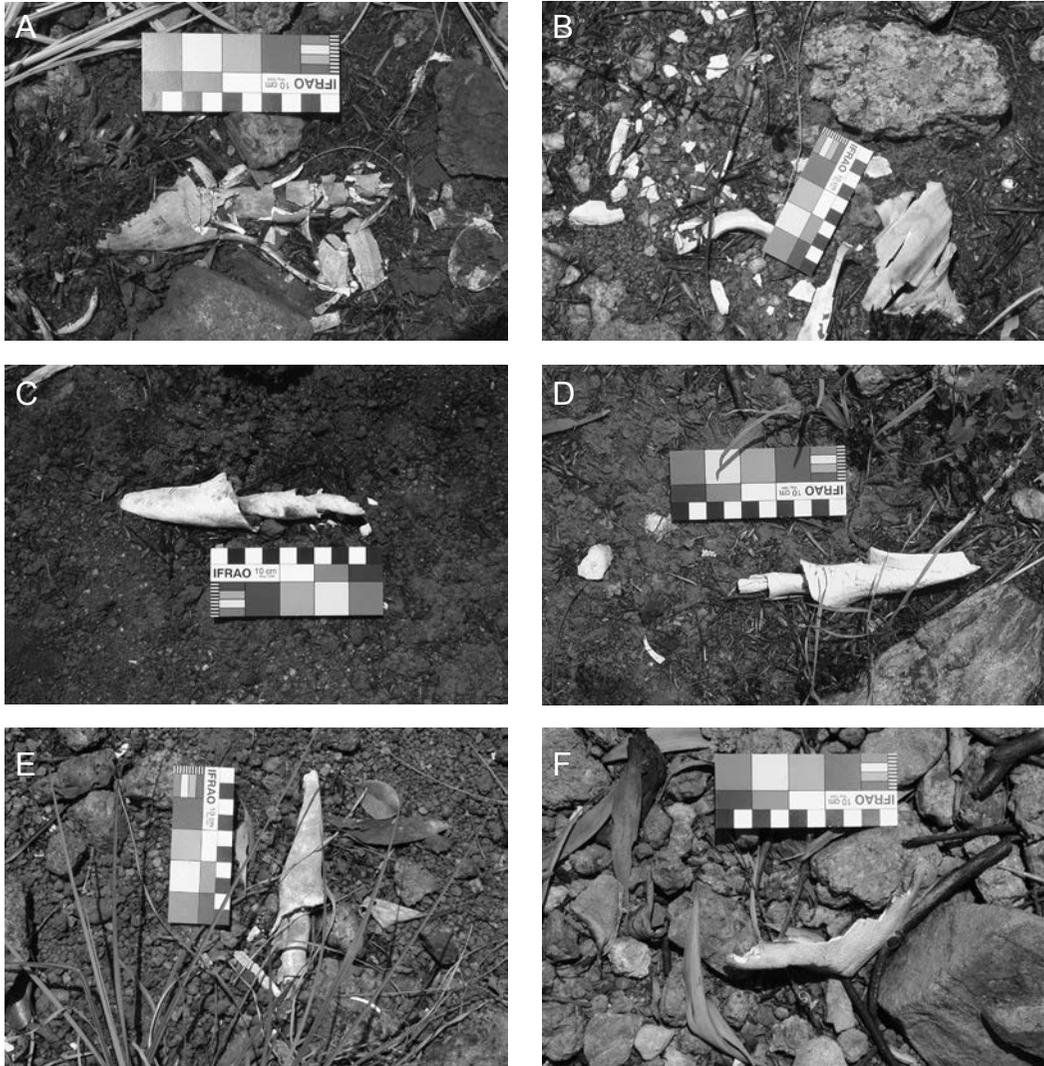


FIG. 18. Mua 38, the *bu* shells. A, *bu* shell 1; B, *bu* shell 2; C, *bu* shell 3; D, *bu* shell 4; E, *bu* shell 5; F, *bu* shell 6.

the northern end, in an area of average shell concentration near the edge of the midden close to where boulders delimit its margins (Figs 22A, B).

Excavation in each square proceeded in XU within stratigraphic units (Figs 23-28, Table 8). These XU averaged 2.2cm in thickness in Squares G30 and Q30. Excavation in Square G30 proceeded to 13cm below the ground, and in Q30 to 9cm; it stopped when basal granite rocks became impenetrable. The two excavated squares at Mua 38 revealed similar sedimentological

and cultural sequences (Tables 8-11). The loose surface sediments are less than 1cm thick. Below this are compact and consolidated silty-gravely sands, very rocky near their base as bedrock is approached. Marine shells only occur within the top 8cm in Square G30, and 5cm in Square Q30. One flaked quartz artefact was found slightly below this in Square Q30; no cultural items occur at deeper levels in Square G30. All of the charcoal comes from recent grass fires, except for a single small piece of ancient wood charcoal in the basal XU of Square G30, which

TABLE 10. Radiocarbon dates and calibrated ages, Mua 38 Squares G30, G40 and on a surface *bu* shells (calibrations using Calib 5.0.2; ΔR -32 \pm 20, Sean Ulm, personal communication 2007). * = cannot calibrate due to nuclear testing ^{14}C .

XU	Type of ^{14}C date	Depth below ground (cm)	Radiocarbon laboratory #	Material dated	$\delta^{13}C$ ‰	% Modern	Radiocarbon date (years BP)	Calibrated age AD (68.3% probability) (probability)	Calibrated age AD (95.4% probability) (probability)
Square G30									
4	AMS	4.3-7.9	Wk-12386	Anadara antiquata	0.2 \pm 0.2	92.8 \pm 0.5	597 \pm 41	1594-1608 (0.047) 1614-1722 (0.950) 1794-1796 (0.003)	1551-1812 (1.000)
Square Q30									
1	conventional	0-0.2	Wk-11944	Anadara antiquata	0.6 \pm 0.2	93.4 \pm 0.5	548 \pm 41	1677-1774 (0.829) 1783-1805 (0.171)	1641-1886 (0.999) 1949-1950* (0.001)
3	conventional	1.4-5.0	Wk-11945	Anadara antiquata	0.6 \pm 0.2	92.8 \pm 0.4	601 \pm 37	1617-1714 (1.000)	1554-1806 (1.000)
Surface <i>bu</i> shell									
Shell # 5	conventional	0	Wk-12385	Syrinx aruanus	2.7 \pm 0.2	93.7 \pm 0.6	525 \pm 48	1687-1821 (1.000)	1659-1901 (0.971) 1928-1950* (0.029)

relates to an old bush fire or camp fire. The food remains from the two excavations are limited to 17 *mu*du and a single *kabar*. The shells do not show signs of progressive disintegration with depth, indicating that the absence of shells in the deepest XU cannot simply be explained by post-depositional weathering. Rather, the beginning of

shell deposition 5-8cm below the ground indicates the commencement of shell disposal at that time. There are few stone artefacts, with a total of five flaked quartz pieces from the excavations indicating that people on the ridge-top were using cutting tools, but not intensively.

TABLE 11. Excavation details and list of materials excavated, Mua 38 Squares G30 and Q30.

XU	SU	Mean Depth Below Surface at Top (cm)	Mean Depth Below Surface at Centre (cm)	Mean Depth Below Surface at Base (cm)	Mean Thickness of XU (cm)	Area Excavated (m ²)	Volume Excavated (l)	Weight Excavated (kg)	Weight of >3mm Non-Cultural Sediments (kg)	Kg per Litre	% of Sediments >3mm (by weight)	Compaction (litres/m ³)	pH	Dry Munsell	Mammal Shell (g)	Charcoal (g)	Flaked Quartz Artefact (#)	Flaked Quartz Artefact (g)	Land Snail (g)
Square G30																			
1	1	0.0	0.3	0.6	0.6	0.25	0.25	0.40	0.4	1.6	100.0	167	7.60	2.5Y 2.5/1 black	52.20	0.24			
2	2	0.6	1.5	2.3	1.7	0.25	6.00	6.25	2.5	1.0	40.0	1412	6.59	2.5Y 3/1 very dark gray	61.52	0.26	1	0.28	
3	2	2.3	3.3	4.3	2.0	0.25	8.00	10.00	5.5	1.3	55.0	1600	5.57	2.5Y 3/1 very dark gray	23.91		1	0.02	
4	2	4.3	6.1	7.9	3.6	0.25	9.00	12.50	5.5	1.4	44.0	1000	5.50	2.5Y 3/1 very dark gray	4.01				
5	2	7.9	9.5	11.0	3.1	0.25	8.00	11.00	4.5	1.4	40.9	1032	5.63	10YR 4/1 dark gray					
6	2	11.0	12.1	13.2	2.2	0.25	6.50	8.50	3.3	1.3	38.8	1182	5.54	10YR 4/1 dark gray		0.03			
Total					13.2		37.75	48.65	21.7						141.64	0.53	2	0.30	
Square Q30																			
1	1	0.0	0.1	0.2	0.2	0.25	2.0	3.5	3.5	1.8	100.0	4000	6.54	10YR 3/1 very dark gray	106.35	0.71			0.06
2	2	0.2	0.8	1.4	1.2	0.25	5.5	6.0	3.0	1.1	50.0	1571	6.24	10YR 3/1 very dark gray	177.80	0.06	1	13.0	
3	2	1.4	3.2	5.0	3.6	0.09	5.5	7.0	3.0	1.3	42.9	1698	5.77	10YR 4/1 dark gray	42.78		1	0.7	
4	3	5.0	6.9	8.7	3.7	0.07	1.5	2.5	1.1	1.7	44.0	579	5.55	10YR 4/1 dark gray			1	5.4	
Total					8.7		14.5	19.0	10.6						326.93	0.77	3	19.1	0.06



FIG. 19. Mua 38, site map showing location of excavation squares and *bu* shells.

Three radiocarbon dates were obtained from the excavations, all on *mudu* shells. Wk-11945 dates the beginning of cultural materials at Square Q30; Wk-12386 dates the equivalent level for Square G30. Together, these two radiocarbon

dates tell us when the Mua 38 midden first started to accumulate, and in so doing when people first started camping at this site. The third radiocarbon date is from the surface of Square Q30. It dates the timing of final site abandonment – that is, when shells were last dropped at the site.

In addition, a radiocarbon date was also obtained on a *bu* shell fragment lying on the ground surface (*bu* shell 5; Figs 18, 19). No fragment of *bu* shell was found in the excavation, and what appears to be a systematic dispersal of six *bu* shells equidistant across the site (Fig. 19) suggests strategic positioning of these items of material culture rather than random food remains. We suggest that these shells served either as warning or announcement instruments (i.e. they were blown for their sound), or as holding containers (for water?) on the hill-top. Rather than being a central or communal camping place, the cultural items at Mua 38 are fully consistent with the site being a sentinel point on lookout for incoming canoes from the west, north or east.

The basal radiocarbon dates from the two excavation squares are very similar, and indicate that Mua 38 most likely began to be used sometime during the 1600s or 1700s AD. The surface date from Square Q30 and the surface date from the *bu* shell are also similar to each other, and indicate that people last dropped shells here sometime between 1641 and 1901 AD, and most likely around 200 years ago. In other words, Mua 38 was most likely used for a few tens of years. Its period of use coincides well with the time when Mua 36 at the base of the hill was used intensively – that is, to the period when Mua 36 was a small village, beginning around 300 years or so ago and likely finishing by the



FIG. 20. Mua 38, Square G30 excavation in progress.

TABLE 12. Excavation details, Mua 84 Square N41.

XU	SU	Mean Depth Below Surface at Top (cm)	Mean Depth Below Surface at Centre (cm)	Mean Depth Below Surface at Base (cm)	Mean Thickness of XU (cm)	Area Excavated (m ²)	Volume Excavated (l)	Weight Excavated (kg)	Weight of >3mm Non-Cultural Sediments (kg)	Kg per Litre	% of Sediments >3mm (by weight)	Compaction (litres/m ³)	pH	Dry Munsell
1	1	0.0	0.1	0.1	0.1	0.25	0.5	0.5	0.5	1.0	100%	2000	6.24	10YR 4/2 dark grayish brown
2	2	0.1	1.2	2.2	2.1	0.25	6.0	7.5	2.0	1.3	27%	1143	5.88	10YR 4/1 to 10YR 4/2 dark gray to dark grayish brown
3	2	2.2	3.2	4.1	1.9	0.24	5.0	6.5	1.3	1.3	19%	1106	5.19	10YR 4/1 to 10YR 4/2 dark gray to dark grayish brown
4	2	4.1	5.4	6.6	2.5	0.24	7.0	9.0	4.0	1.3	44%	1160	5.36	10YR 4/1 to 10YR 4/2 dark gray to dark grayish brown
5	2	6.6	7.8	8.9	2.3	0.23	5.5	8.0	3.5	1.5	44%	1043	5.20	10YR 4/1 to 10YR 4/2 dark gray to dark grayish brown
6	2	8.9	10.7	12.5	3.6	0.22	7.0	11.0	6.5	1.6	59%	889	5.14	10YR 4/1 to 10YR 4/2 dark gray to dark grayish brown
7	2	12.5	14.0	15.4	2.9	0.20	5.0	8.0	4.0	1.6	50%	862	5.18	10YR 4/2 dark grayish brown
8	2	15.4	18.1	20.7	5.3	0.12	6.5	11.0	5.5	1.7	50%	1019	5.13	10YR 4/2 dark grayish brown
Total					20.7		42.5	61.5	27.3					

early 1800s. We will return to this point in the Discussion section below.

GERAIN: MUA 84

The ridge-top on which Mua 38 is found extends northwards past this site, sloping down sharply before flattening out again and eventually plunging into the sea. Along this northernmost extension at Gerain, within 100m of the shore and 20m above the high water mark, is another midden, Mua 84 (Figs 29-31). Surrounding it, along the nearby slopes, are numerous other shell middens, but Mua 84 is the most extensive and densest. However, no-where does it possess anything like the density of cultural materials seen at Mua 36.

On the ridge-top at the point at Gerain stunted trees grow, no more than 2m in height, on what is essentially a ridge-top grassland. Here there are many granite boulders and rocks, with a natural clearing devoid of trees and boulders upon which can be found the sparse shell midden (which also contains two pieces of broken glass) of Mua 84. Cultural materials are spread over the ridge-top and its upper slopes across an area 40m long by 20m wide. Ashy sandy sediments occur on this ridge-top where the midden is found. The ridge-top is itself c.70m long, narrow (c.40m wide) and flat, having steep but climbable slopes going down to beaches on either side and to a rocky headland at its northern end (Gerain Point itself). Conditions here tend to be very windy due to exposure to both the eastern and western winds.

TABLE 13. List of materials excavated, Mua 84 Square N41.

XU	Dugong & Turtle Bone (g)	Marine Shell (g)	Charcoal (g)	Flaked Quartz Artefact (#)	Flaked Quartz Artefact (g)	Flaked Igneous Artefact (#)	Flaked Igneous Artefact (g)	Red Ochre (#)	Red Ochre (g)	Termite Nest (g)
1	0.04	107.7		1	0.2					
2		52.7	0.02	13	3.1					
3		0.2		6	3.6					0.05
4				10	4.4			1	0.01	
5				10	3.6	2	6.6			
6				16	12.4			1	1.11	
7				6	2.6					
8				14	8.3	1	10.9			
Total	0.04	160.6	0.02	76	38.1	3	17.4	2	1.12	0.05

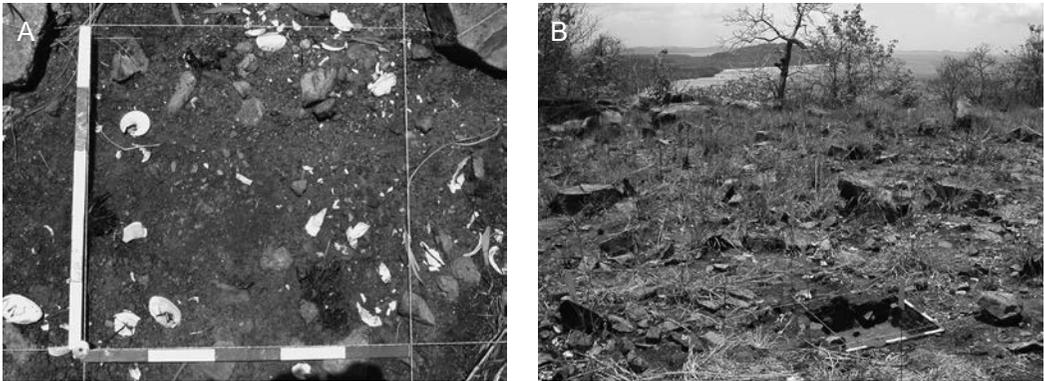


FIG. 21. Mua 38. A, Square G30 prior to commencement of excavation; B, Square G30 after completion of excavation.

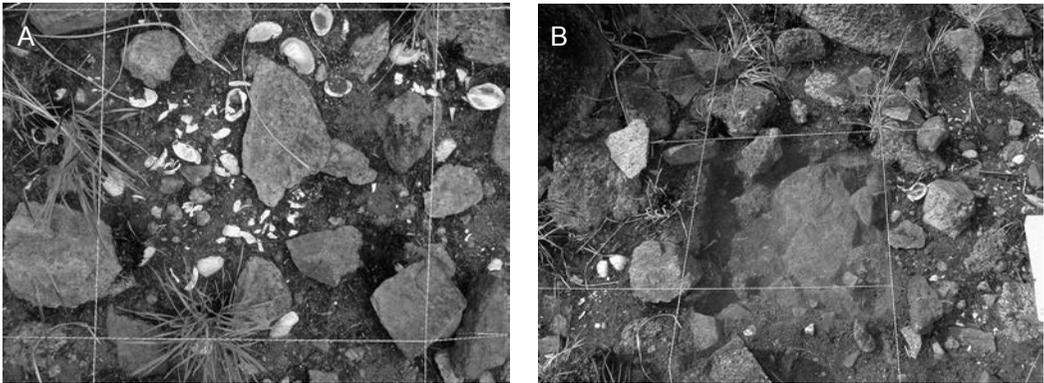


FIG. 22. Mua 38 A, Square Q30 before commencement of excavation; B, Square Q30 after completion of excavation.

A single 50×50 cm square (N41) was excavated at Mua 84, towards the top of the ridge on a flat area near its eastern edge where surface cultural materials are densest (Fig. 32). The excavation was undertaken in eight XU and proceeded to 21cm below the surface until an impenetrable but fragmented rocky base was reached (Figs 33-35). The XU averaged 2.6cm in thickness. Sediments in the excavation square consist of a thin layer of loose surface gravel and granite rocks along with midden material. A marked change then occurs with the underlying SU2 sediments, which consist of consolidated rocky sandy loam. Numerous granite rocks ranging from gravel to $30 \times 20 \times 25$ cm in size occur here. These sediments were very hard to dig due to the presence of inter-wedged granite rocks and compact and consolidated sediments. At the base of the excavation, about half of the square was taken up by the slanting upper surfaces of two

large granite boulders (parts of which extend to the exposed surfaces of a large boulder on the ground near the excavation square). Two other large granite rocks are also solidly positioned inside the excavation square. Excavation was stopped



FIG. 23. Mua 38, Square G30 after completion of excavation, east and south walls.

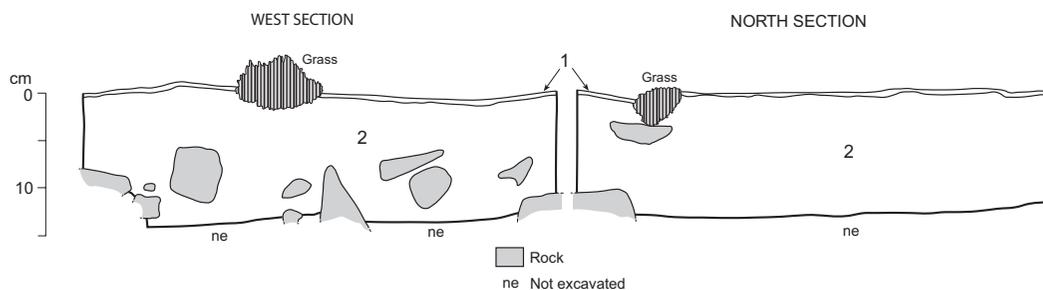


FIG. 24. Mue 38, Square G30 section drawings, west and north walls.

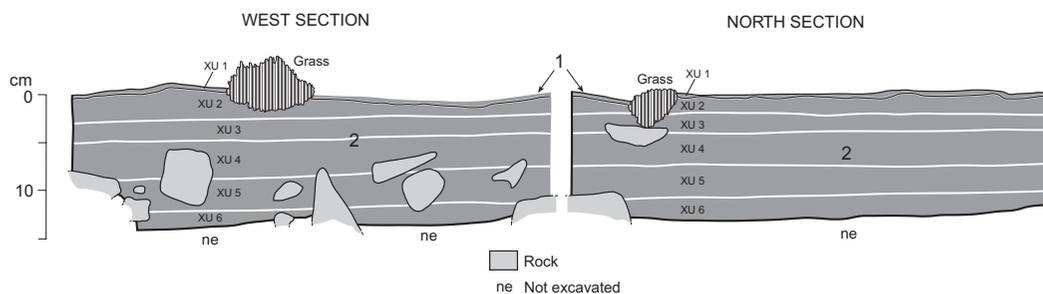


FIG. 25. Mue 38, Square G30 section drawings, west and north walls, with XU shown.

TABLE 14. Radiocarbon date and calibrated ages, Mue 84 Square N41 (calibration using Calib 5.0.2; $\Delta R = 32 \pm 20$, Sean Ulm, pers. comm., 2007). * = cannot calibrate due to nuclear testing ^{14}C .

XU	Type of ^{14}C date	Depth below ground (cm)	Radiocarbon laboratory #	Material dated	$\delta^{13}\text{C}$ ‰	% Modern	Radiocarbon date (years BP)	Calibrated age AD (68.3% probability) (probability)	Calibrated age AD (95.4% probability) (probability)
2	conventional	0.1-2.2	Wk-14180	marine shell	0.5 ± 0.2	94.1 ± 0.3	488 ± 35	1712-1853 (1.000)	1693-1904 (0.934) 1922-1950* (0.066)

when the inter-wedged rocks took up much of the square rendering excavation too difficult to proceed. Cultural materials were found in all XU – that is, at all levels down to the rocky basal layer – although food refuse (shells, dugong and/or turtle bone) was not found below XU3 (i.e. the deepest food remains occurred 4cm below the ground) (Tables 12-15). The presence of stone artefacts below this indicates that people came here prior to the period represented by the shells. We do not know the age of this earlier use of the site, nor do we know whether or not people then left behind food remains that have now weathered away, as no reliable datable materials were found below XU3. The deepest shells at Mue 84 do appear to be more chemically weathered than those at the surface, indicating that if shells and bones had been left behind during those earliest times, they would probably have disappeared by now.

A single radiocarbon date was obtained from the deepest level with sufficient material for dating, XU2 (Table 14). The result indicates that people were using this site sometime during the last 300 years, most likely including sometime between 1712 and 1853 AD; we do not know exactly when during this period of time the site was used as radiocarbon dating does not allow us to be more precise. However, these results do indicate that repeated use was made of Gerain Point for the consumption and discard of shellfish around the same time that the village existed at Urakaraltam (Mue 36) and the lookout was in operation on the nearby Gerain hill-top at Mue 38.

We conclude that the area at Gerain Point was repeatedly used for the casual consumption of shellfish, and minor amounts of dugong or turtle meat, during the 1700s, and possibly into

TABLE 15. Excavated shells, Mua 84 Square N41.

XU	Unidentified shell fragments	Nerita >1.5cm long					Unidentified Species 1		Anadara antiquata								
	Weight (g)	MNI: apex	MNI: >50% posterior teeth	MNI: >50% outer lip teeth	MNI: >50% height	MNI	Weight (g)	MNI: >50% hinge teeth	Weight (g)	MNI: >50% left valve umbo	MNI: >50% left valve hinge	MNI: >50% left valve length	MNI: >50% right valve umbo	MNI: >50% right valve hinge	MNI: >50% right valve length	MNI	Weight (g)
1	5.3	1			1	1	1.4			1	1	1	2	2	1	2	38.1
2	16.7							1	0.18								
3	0.2									1	1		3	1	3	3	33.8
4																	
5																	
6																	
7																	
8																	
Total	22.2	1	0	0	1	1	1.4	1	0.18	1	2	2	5	3	4	5	71.9

XU	Trochus niloticus					Turbo sp.					Total weight (g)
	MNI: apex	MNI: >50% aperture	MNI: >50% height	MNI	Weight (g)	MNI: apex	MNI: >50% operculum	MNI: >50% height	MNI	Weight (g)	
1	1	1	1	1	62.9						107.7
2				1	0.6	1	1		1	1.3	52.7
3											0.2
4											
5											
6											
7											
8											
Total	1	1	1	2	63.5	1	0	0	1	1.2	160.6

earliest times, although they probably burnt the landscape and exploited local resources. There is no evidence of a village here at this time.

Then things changed. After about 300 years ago, Mua 36 and the flat area nearby at Urakaraltam has all the hallmarks of an old village site, camouflaged from passing seafarers by the narrow mangroves between it and the sea. Mua 38 on the adjacent hill-top appears to represent a sentinel post, with its excellent views to Badu and Mabuyag capable of warning the Mua 36 residents of incoming raiders, and welcoming homecoming villagers.

Mua 84 further towards the point appears to have been used for short-duration stops at the same time as the village existed at Mua 36. Further archaeological investigations in this area,

the early 1800s. People made and used stone cutting tools during this time, although we do not know to which purposes they were put.

DISCUSSION

The complex of cultural sites along the ridge-top at Gerain and Urakaraltam – Mua 36-38 in particular – has shown itself to be best understood when considered together. Some of these sites were almost certainly used in conjunction with other sites, so that when combined they formed specialised nodes in an integrated subsistence-settlement system. At first, since at least 1150 years ago, people came here for short periods of time, probably measured in hours or a few days rather than more permanently. We do not have many clues as to what they did during those



FIG. 26. Mua 38, Square Q30 after completion of excavation, west wall.

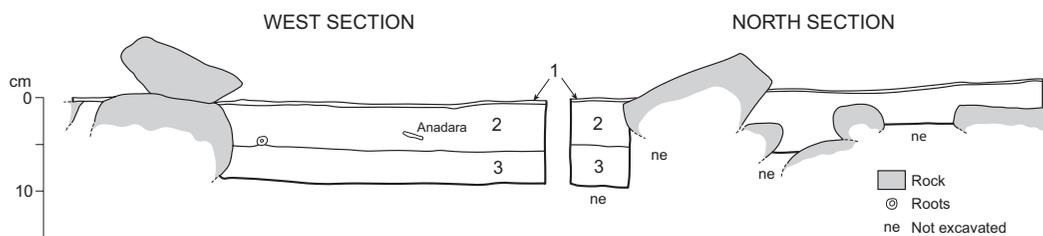


FIG. 27. Mua 38, Square Q30 section drawings, west and north walls.

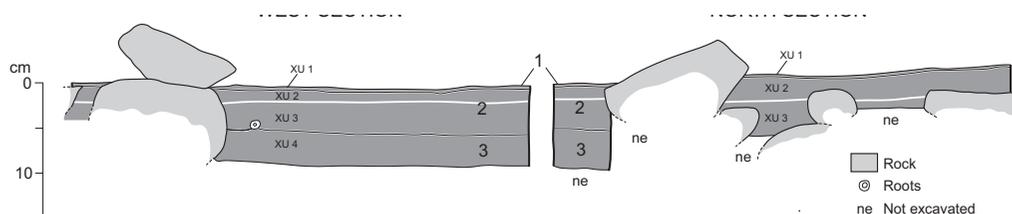


FIG. 28. Mua 38, Square Q30 section drawings, west and north walls, with XU shown.

including radiocarbon dating, are required to shed further light on the history at these and nearby sites.

In presenting these interpretations, we must also further comment on the nature of Mua 38. We do not think Mua 38 is a specialised magic or ritual place, although it is possible that Mua 39 (also on the hilltop and away from the gaze of everyday village life) had a special function such as education of youths in secret or specialised knowledge (there is an enigmatic, cleared area that we do not properly understand amongst the rocks at Mua 39; see Fig. 16). Nor do we think Mua 38 was simply a training area for boys or *puripuri* (magic) places where secret magic was undertaken (although it is possible that boys



FIG. 29. Gerain Point, where site Mua 84 is located.

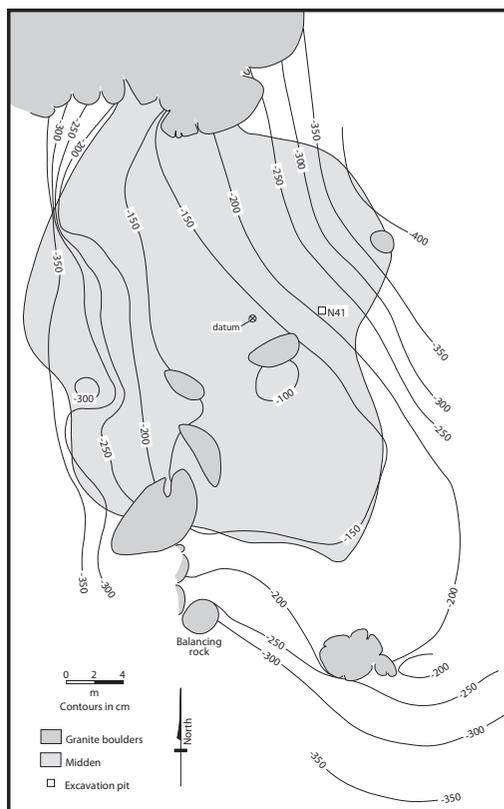


FIG. 30. Site map, Mua 84.



FIG. 31. Mua 84, showing typical density of cultural materials.



FIG. 32. Mua 84, Square N41 excavation prior to excavation.

were trained by men in association with sentinel activities). We say this because while in Western Torres Strait there are numerous hill-top locations where magic and other kinds of ritual and/or specialised training of youths were performed,

these are not normally known to contain food remains. Indeed, we have now recorded over a dozen hill-top sites in Western Torres Strait that appear to have had ritual functions, and none have yet revealed shell middens such as those

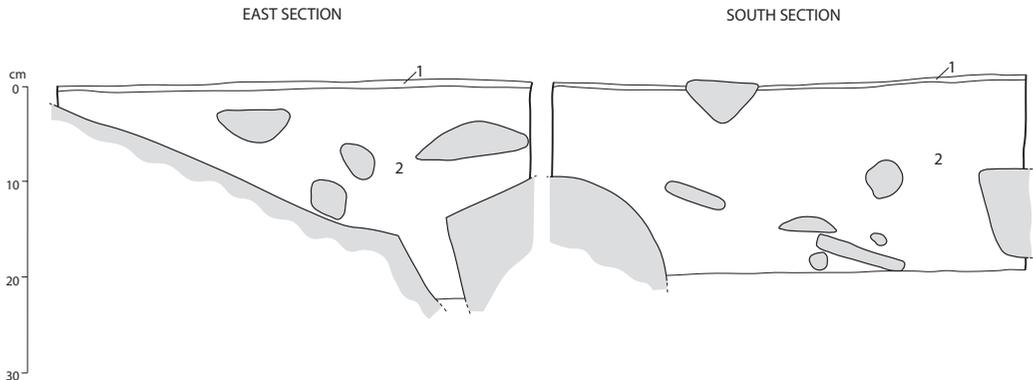


FIG. 33. Mua 84, Square N41 section drawings, east and south walls.

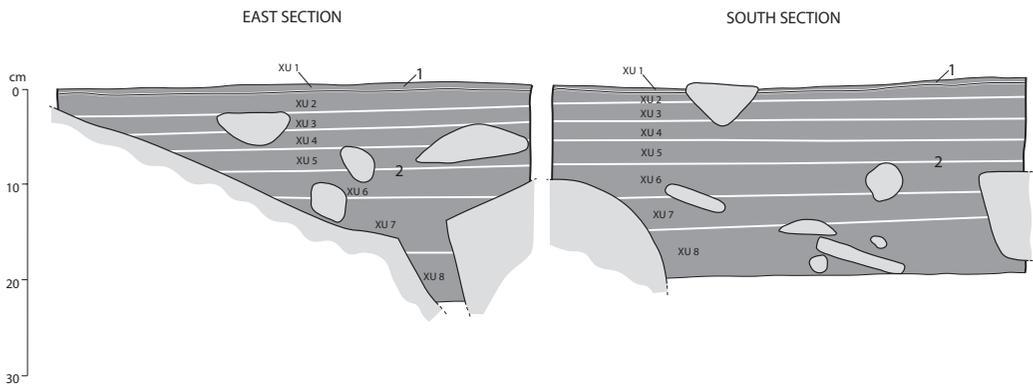


FIG. 34. Mua 84, Square N41 section drawings, east and south walls, with individual XU superimposed.



FIG. 35. Mua 84, Square N41 west and north walls after completion of excavation.

found at Mua 38 and Mua 39. Rather, ridge-top *puripuri* and other secret places are repeatedly found to have an absence of food remains, containing rather ritual structures made of rock, or complex *bu* shell arrangements (David et al., 2004b, 2005).

For two reasons we can directly relate the use of Mua 38 to the intensive occupation of Mua 36 during the 18th century AD. First, the radiocarbon dates at both sites indicate contemporaneity – that is, they were used at the same time. Second, *mudu*, the dominant shellfish eaten on the ridge-top at Mua 38, is the same species that dominates at Mua 36. And *mudu* can be found in the mudflats nearby. The total absence of dugong, turtle and fish bone at Mua 38 further indicates that this was not an intensive camping ground, nor was it a place where communal cooking took place, but rather a specialised place where people brought ‘snack foods’. That is, it was never a major base camp. That honour went to Mua 36. We thus conclude that Mua 38 was a sentinel post for the Mua 36 village, with watchers looking out for enemy raiders coming from Badu and Mabuyag in particular.

In this context, it is worth noting that the Mualgal were at war with their neighbours the Badulgal and Goemulgal during the period immediately prior to the arrival of Europeans, and numerous raids and massacres by warriors from Badu and Mabuyag dating to that period of time are known from oral history (see Haddon, 1935, e.g. pp. 62–65; Haddon & Wilkin, 1904; Wilkin, 1904 for discussions on this state of warfare). In 1898 Anthony Wilkin (1904: 308) even recorded an oral tradition about an impromptu raid by

Mabuyag men on Murarath a few hundred metres to the west of Urakaraltam. This state of war was so prevalent that by the late 1800s the Mualgal ‘were always ready to abandon [their villages and houses] [...] for a time and live in the bush among the great hills on the eastern side of the island [...]’ (Wilkin & Haddon, 1912: 95). The presence of a small village camouflaged behind the mangroves at Urakaraltam, with a sentinel station on the nearby hill ready to warn the villagers below, is entirely consistent with these known dimensions of Mualgal history. It is also of great interest to note the presence of the crocodile stone arrangement (Mua 37) on the ridge-top next to the sentinel point shell midden (Mua 38) where, we suggest, the warriors were on the lookout for enemy canoes (amongst other things). The *kodal* (crocodile) clan was recognised on Mua as well as on most, if not all, the other islands of Western Torres Strait. While the area of Urakaraltam-Gerain-Bulbul-Usar is today known by the Mualgal to be territory of the *dhangal* (dugong) clan, it is also stated by Haddon & Rivers (1904: 162, 177) that in some parts of the Western Islands of the Straits, and probably widespread across the region, ‘*Dangal* is associated with *Kodal*’, and ‘It is true that the largest number of marriages recorded are between the *Dangal* and *Kodal* clans’. It therefore comes as no surprise to find a *kodal* stone arrangement in *dhangal* territory. This becomes even more understandable when we realise that on Mua there was an *augadh* (totem, or sacred design) of *kodal* near the village of Poid on the western side of the island during the early European contact period (Haddon, 1935: 64), and that, again specifically on Mua (and possibly elsewhere), ‘the *kodal* men were the warriors’ (Haddon, 1935: 64). If the sentinels stationed on the ridge-top above the village at Urakaraltam were warriors on the lookout for enemy raiders and incoming local or allied villagers, as is most likely, then the marking of the lookout with a *kodal augadh* becomes less mysterious.

CONCLUSION

Mualgal have been coming to Urakaraltam, and to the area of Mua 36 specifically, for at least 1150 years, and probably for longer than this. At first, people came, burnt the grass (and other vegetation), and spent short amounts of time at Urakaraltam. Around 300 years ago, however, things changed. People built a village well hidden from the open sea by a narrow strip of mangrove at this time, although we do

not know exactly how large the village was, nor do we know if it was lived in year-round or at certain times of the year only. However, the village was not likely to be very large, for the dense cultural materials are not extensive enough for a large village. During that period of time that the village was in use, sentinels were stationed on the nearby hill-top, on the lookout for incoming canoes so as to announce to the villagers below the approach of enemy raiders or local villagers returning from the hunt, and possibly also dugongs and turtles seen in the nearby waters. These sentinels were likely to have been warriors of the *kodal* clan; the lookout point was marked by a *kodal augadh*. The village at the base, and the sentinel station on top of the ridge were last in use sometime before the arrival of Europeans, most likely during the early 1800s.

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Kaima eso.

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