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A 2500 YEAR OLD PSEUDO SHELL MIDDEN ON LONGREACH BAY, ROTTNEST ISLAND, WESTERN AUSTRALIA

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Introduction

On several occasions during the past decade, Perth-based and occasional visiting Quaternary researchers have examined possible prehistoric human occupation sites on Rottnest Island, 20 km west of Fremantle, WA (Fig.1). The following describes findings from recent investigations of possible prehistoric midden material from a site on Longreach Bay, Rottnest Island.

The island

Rottnest Island is the largest and most northerly of several islands on the continental shelf near Perth. Dr P.E. Playford has recently published a summary of the island's geology and physiography in which he describes the 1900 ha island as being 'composed wholly of Quaternary deposits, mainly Pleistocene limestone and Holocene dune sand', with a coastline 'characterised by alternating bays and limestone headlands' (Playford 1977:10). Topographically the island is dominated by limestone hills and sand dunes. There is a series of salt lakes in the northeastern part of the island and before extensive modern development the island contained a number of small freshwater swamps. The calcareous soils of the island are very well drained. Surface freshwater is now virtually absent, except around the margins of the salt lakes where Playford notes 'Numerous small fresh-to-brackish-water seepages' (1977:10). The original vegetation, now very largely destroyed, consisted of forests of ti-trees, wattles and Rottnest Island Pine (*Callitris preisi*), and areas of open heath (Storr *et al.* 1959). It has been estimated that native forest, which now covers only 5% of the island, once occupied 65% (Playford 1977:10).

Shoreline features on the island have often been cited in studies of Quaternary eustatic sea level changes (e.g. Fairbridge 1961). Evidence now suggests that limestone reef platforms and wave-cut notches, as much as 3 m above present sea level, earlier thought to be formed solely by eustatic high sea levels (Fairbridge 1961; Teichert 1950), may instead be partly the result of local tectonic uplift (Playford 1977:32, 34, 37).

Marine shell beds exposed on old shorelines around the salt lakes are thought to have been deposited during mid-Holocene high sea levels. (For discussion of possible mid-Holocene tectonism and eustatic sea level changes see Playford 1977 and Playford *et al.* in press.) These shell beds have more than once been mistaken for middens, as have accumulations of shells removed from the beds and used for road-building in other parts of the island.

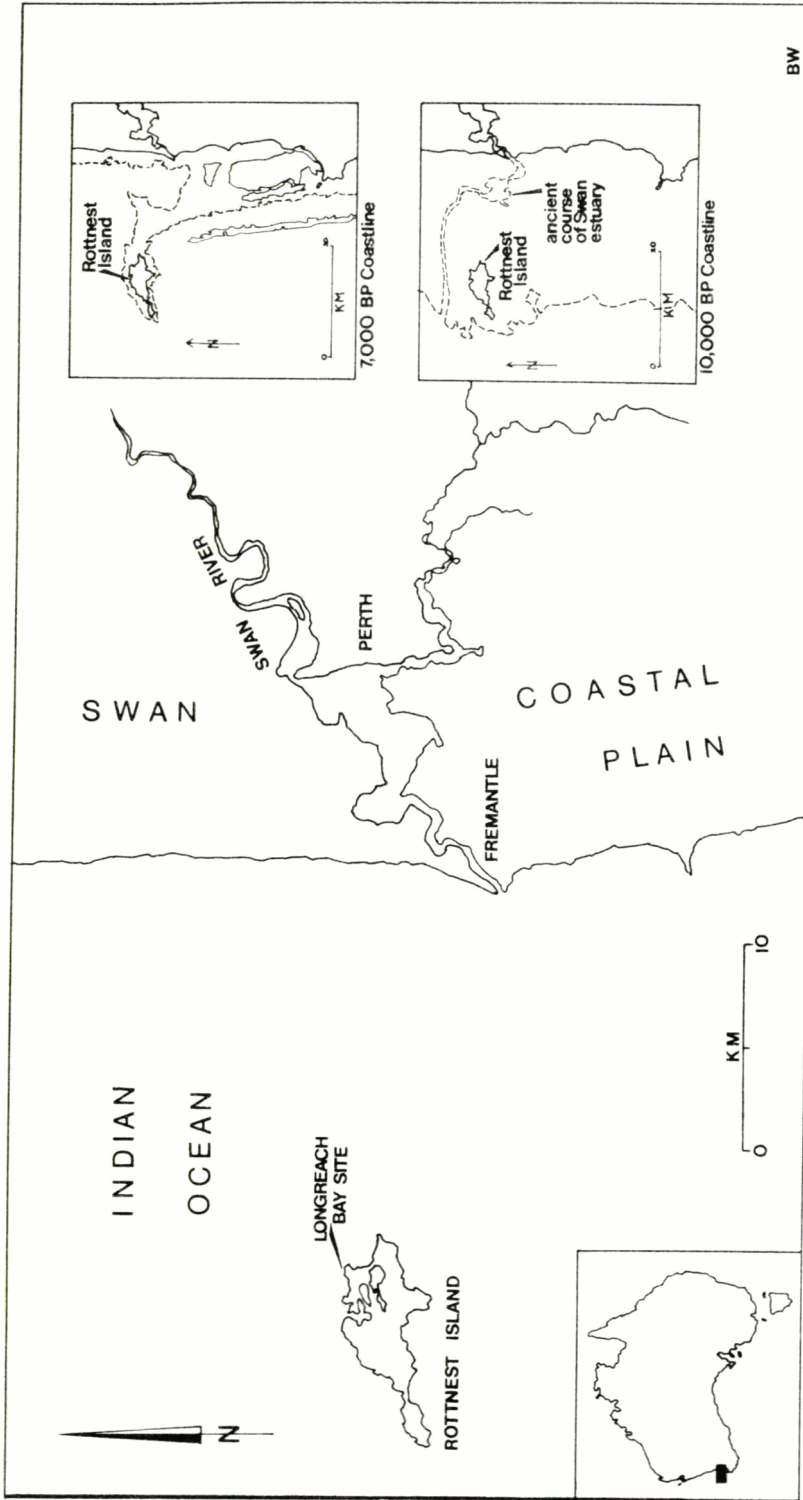


Fig. 1 Rottnest Island, Western Australia. Insets after Churchill 1959.

There are other, sometimes monospecific shell heaps on various limestone headlands around the island. These too have been interpreted as possible middens, though at present no archaeological material is known from any of these to support such an interpretation.

Aboriginal occupation

There is no evidence for prehistoric Aboriginal occupation of Rottneest Island; and it is generally felt that the island was not occupied by Aborigines after having been cut off by rising seas about 6500 years ago (Churchill 1959:Fig.2; Teichert 1959). The present lack of any archaeological material of early Holocene or late Pleistocene age seems surprising because in some ways the island probably was always exploitable by hunter-gatherers. At times of low sea level the island would have been a series of densely vegetated, elevated dunes and ridges probably harbouring a variety of game. The present salt lakes would have been deeply excavated karst features (Playford 1977:37). Plausible situations for late glacial and early Holocene occupation sites exist in the marine, lacustrine and aeolian deposits now found in the vicinity of the salt lakes and swamps. Another area likely to have been occupied at this time is now off-shore between the island and the late glacial to early Holocene channel of the Swan Estuary, 8-10 km to the north (Fig.1, inset).

The only known Aboriginal occupation of the island took place between 1838 and 1931 when the colony, and later, the state of Western Australia maintained a prison specifically for Aborigines (Somerville 1949). During the latter half of its tragic existence this prison held numerous Aboriginal men, including some from the Kimberley district who had been transported 2000 km southward from Broome to serve their sentences. The Aborigines were allowed limited foraging rights on the island by the more lenient governors. The principal game was probably quokkas (a species of rat-kangaroo from which the island receives its name) and water fowl; and the weapons used were spear and boomerang (Somerville 1949). Somerville also records that fish were taken with hook and line; he does not record shellfish gathering, though many of the prisoners from coastal areas in the northwest must have been aware of this source of food.

The Kimberley inmates at least, used spears armed with bifacially flaked glass points. Numbers of glass bifacial points, invasively flaked and typical of the 'Kimberley' form (McCarthy 1967:Fig.22), have been found on the eastern end of the island (Serventy 1967). One of these, collected some 300 m south of the Longreach Bay Site (Fig.1) by Dr R. Horwitz, CSIRO, Perth, is illustrated in Figure 2.2.

The Longreach Bay site (National grid reference: SI 50-2 35130436)

The site is located on a wave-cut bench in a small headland of Tamala Limestone (Playford 1977:13) which forms the eastern end of Longreach Bay (Figs 1, 3). We first investigated the site as a possible shell midden left by foraging Aboriginal prisoners. This

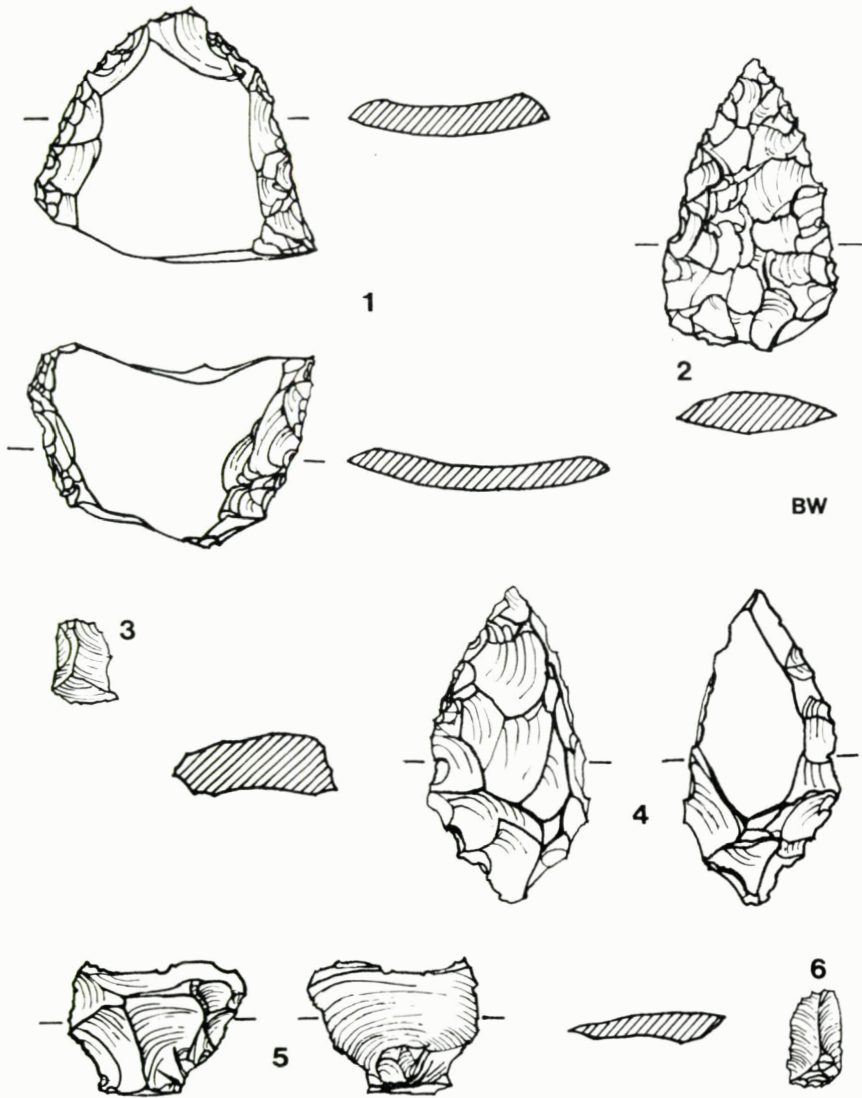


Fig. 2 Flaked glass artifacts from Rottnest Island, W.A.

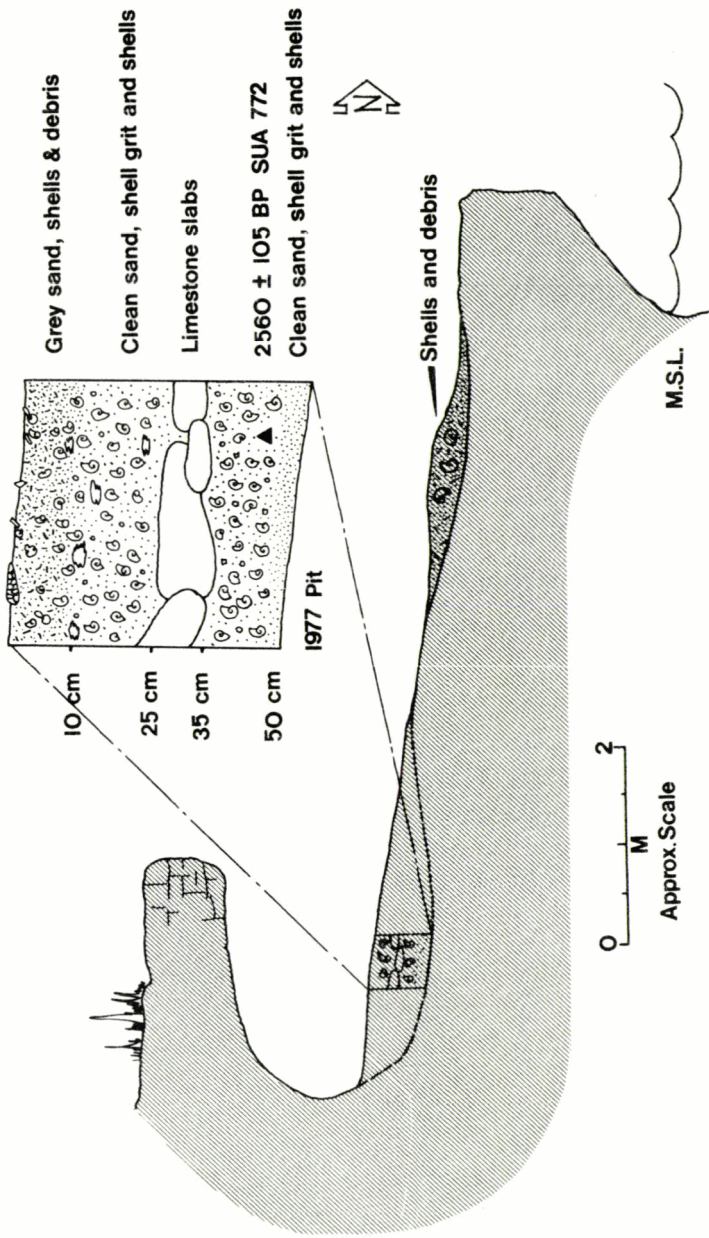


Fig. 3 Schematised cross section of the Longreach Bay site, Rottnest Island, W.A.

was suggested by a heap of limestone fragments, turban and other marine shells, charcoal and artefacts lying in a depression at the seaward end of the bench. This deposit, which contained a few pieces of flaked glass (flakes e.g. Fig.2.5), and parts of a uniface glass point (Fig.2.1), was found to be thoroughly disturbed. Contemporary artefacts (e.g. cigarette filters) occurred below late 19th or early 20th century flaked glass. We suggest that the deposit was not a midden (i.e. an archaeological deposit in primary position), but instead a largely naturally accumulated heap of debris transported by gravity and water action. Water action here refers only to run-off from rain or occasional heavy spray from large waves, because at present the surface of the bench seems well above the splash zone.

Further examination of the site showed a deposit lying within a prominent notch and overhanging visor at the landward end of the bench. A test pit dug into this deposit in June 1977 revealed the following sequence.

- 0-10 cm Dirty grey sand with turban and other marine shells, charcoal, and artefacts including both flaked glass dating to the prison period, and contemporary artefacts such as aluminium ring pulls from drink cans. The shells are identified as follows:
 Turbo (Marmarostoma) pulcher Reeve
 Hipponix (Sabia) conicus (Schumacher)
 gastropod fragments, indeterminate
- 10-25 cm Clean calcareous sand and shell grit containing turban and other shells, and angular roof fall fragments but no charcoal or artefacts of any kind. Shells identified are as follows:
 Turbo (Marmarostoma) pulcher Reeve
 Hipponix (Sabia) conicus (Schumacher)
 Turbo (Ninella) whitleyi (Iredale)
- 25-35 cm A zone of limestone slabs weighing up to several kg in a matrix of clean sand and grit. No shells were collected in this zone.
- 35-50 cm Turban and a few other shells in clean sand and shell grit, resting on smooth limestone bedrock. Shells are identified as follows:
 Bivalve
 Brachidontes ustulatus (Lamarck)
- Gastropods
 Acmaea (Notoacmea) onychitis (Merke)
 **Turbo (Marmarostoma) pulcher* Reeve
 Campanile symbolicum Iredale
 Hipponix (Sabia) conicus (Schumacher)
 Nucella (Dicathais) orbita (Gmelin)
- * most common species

A 250 gm sample of turban (*T. pulcher*) shells from the 35-50 cm zone of the deposit was submitted to the University of Sydney Radiocarbon Laboratory for assay and yielded a date of 2560 ± 105 BP (SUA-772). X-ray diffraction analysis showed that the shell submitted for dating was composed of aragonite, and that no calcite was detectable. Thus the above date is in order, since there is no evidence for recrystallisation of the shell carbonate (WA Government Chemical Laboratory Report No.61521-2/77).

This deposit seemed of particular interest for the following reasons.

1. It was sheltered, so precluding the possibility that the shell had accumulated through being dropped by Pacific Gulls, as recorded at several Rottneest Island shoreline localities by Teichert and Serventy (1947).
2. The marked predominance of well preserved turban shells seemed to indicate a human origin because middens are often dominated by a single species. Furthermore most of the turban shells were broken, and their angular fractures were not in accordance with natural wear and weathering.
3. The presence of flaked bottle glass within the upper few centimetres.

These facts led us to believe that the site was likely to be a modern midden dating from the prison era. The 2500 BP date was unexpected because there was no previous evidence to suggest Aboriginal occupation on the island at that time. For this reason the site was again examined in March 1978 with the purpose of determining whether it was in fact a prehistoric archaeological deposit.

A small 50 cm square test pit adjacent to the 1977 excavation revealed the following sequence:

- | | |
|----------|--|
| 0-10 cm | Disturbed dirty grey sand with charcoal, flaked glass, modern artefacts, charcoal, shells, and other marine remains. |
| 10-30 cm | Clean calcareous sand and shell grit, whole turban shells, shell fragments, and angular limestone blocks, presumably roof fall. In the lower 15 cm of this zone the limestone fragments were rounded, and heavily abraded. |
| 30-40 cm | Beneath the rounded roof fall fragments whole turban shells were relatively scarce, and small shell fragments predominated. The last 3 cm consisted of shell grit and very fine sand resting on smooth limestone bedrock. |

The 1978 excavation revealed three additions to the shell suite identified in the 1977 excavation.

Bivalve

Katelysia scalarina (Lamarck)

probably a mid-Holocene fossil derived from the lakes.

Gastropods

Acmaea (Patelloida) alticostata (Angas)

Littorina (Austrolittorina) unifasciata (Gray)

Below 10 cm in this excavation, as in the 1977 pit, there were no artefacts, charcoal or other evidence of human occupation.

Discussion

The 1977 investigations in conjunction with the 2500 BP date suggested that the Longreach Bay site was possibly a prehistoric Aboriginal midden. This interpretation of the deposit was made partly because it did not resemble an accumulation of rolled shells and pebbles as are commonly found around rocky shores on Rottneet Island. The results of the 1978 excavation have altered this interpretation of the deposit. The factors that have influenced this revision include the absence of charcoal and cultural material below a depth of 10 cm; the lack of any evidence on the shells for their having been burnt, which may be significant as Aborigines habitually cook shellfish before consumption; and the presence of the rounded limestone fragments towards the base of the deposit. The significance of the difference in the limestone fragments from the top to bottom of the deposit had not been realised in the 1977 excavation. The rounded rocks are not roof fall but reef cobbles showing marine worm borings. These relate to the period when the bench was cut, presumably during the middle Holocene (Playford 1977:32, 34, 37).

Taking into account the possibility that the shells in the deposit are the remains of a re-worked midden (Hughes and Sullivan 1974), we consider that it is a natural accumulation of shells in which the smaller, softer shell component towards the base has been reduced to grit by attrition. We believe that the rounding and sorting seen in the lower part of the deposit probably represents a time of higher sea level when high energy wave surge caused some abrasion of the large limestone fragments, the destruction of small shells and the partial fracturing of the more robust shells. The sorting of the shells, grit and sand in the deposit between 25 cm and 50 cm indicates that the deposition of this material probably took place continually, and in a littoral situation. It must be pointed out, however, that the upper part of the shell component includes very small shells and angular fragments inconsistent with an extended period of tumbling in a wave zone and more characteristic of fracture patterns seen in shells in storm beaches or middens. We suggest that the deposit accumulated over a relatively brief period though we are uncertain of the way in which the large shells were broken. The possibility of the deposit being a storm beach seems unlikely, because of its sorting and its few shell species. The presence of charcoal in the upper levels shows that fires have been lit on top of the deposit, and this may account for some of the angular fracture of

the shells. However the heat produced by these fires would not penetrate deeper than several centimetres, and could not have caused the angular fracture pattern seen below the zone of roof fall.

It appears likely that the limestone slabs towards the base had become at least partially rounded by wave action prior to the deposition of the shell material.

Conclusions

It seems likely that most of the shell component in the deposit was stranded during an event when wave action was sufficient to produce a deposit with the whole shell component of a storm beach and the sorting characteristic of the rolled shell and pebble accumulations mentioned previously. We cannot preclude the possibility that the surface zone of the sheltered deposit represents the remains of a shellfish midden from the prison era. What is clear, however, is that Aboriginal prisoners manufactured glass bifacial points while sitting in the shelter. Small delicate flakes and bladelets with linear butts, typical of those produced in pressure flaking, and at least one large pressure flaked glass fragment (Figs 2.3,4,6) provide evidence for this activity.

We therefore conclude that the deposit is a spearhead manufacturing site overlying a naturally accumulated shell deposit.

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References

- Churchill, D.M. 1959 Late Quaternary eustatic changes in the Swan River district. *Journal of the Royal Society of Western Australia* 42:53-5
- Fairbridge, R.W. 1961 Eustatic changes in sea level. In *Physics and chemistry of the earth*. Pergamon: London. Pp.99-185
- Hughes, P.J. and M.E. Sullivan 1974 The re-deposition of midden material by storm waves. *Journal of the Royal Society of New South Wales* 107:6-10
- McCarthy, F.D. 1969 *Australian Aboriginal stone implements*. The Australian Museum: Sydney

- Playford, P.E. 1977 Geology and groundwater potential. In P.E. Playford and R.E.J. Leech, *Geology and hydrology of Rottnest Island*. Geological survey of Western Australia Report 6
- A.E. Cockbain and G.H. Low (in press) Geology of the Perth Basin, Western Australia. *Western Australian Geological Survey Bulletin* 124
- Serventy, P.E. 1967 Aboriginal artifacts on Rottnest Island. *W.A. Naturalist* 10:123-4
- Somerville, W. 1949 *Rottnest Island*. Rottnest Island Board of Control special publication
- Storr, G.M., J.W. Green and D.M. Churchill 1959 The vegetation of Rottnest Island. *Journal of the Royal Society of Western Australia* 42:70
- Teichert, C. 1950 Late Quaternary sea level changes at Rottnest Island, Western Australia. *Proceedings of the Royal Society of Victoria* 59:63-79
- and D.L. Serventy 1947 Deposits of shells transported by birds. *American Journal of Science* 245:322-32

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