ST HELENA ISLAND - A CHANGING PATTERN OF EXPLOITATION?

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Discussion about the Aboriginal use of offshore islands (Sullivan 1982a, 1982b) has prompted this preliminary report on St Helena Island, Moreton Bay, Queensland, which has evidence of over 2000 years of Aboriginal exploitation. A midden on this island exhibits the high density of bone typical of middens on New South Wales offshore islands, but in this case it is a large migratory fruit bat (*Pteropus poliocephalus*) rather than bird that is specifically exploited. Initial analysis of a small test excavation has revealed a change in the midden composition which would appear to indicate a change in the pattern of exploitation. Independent evidence appears to exist for a build-up of the mudflats between the mainland and the island, and the resultant increase in littoral resources, together with easier access to the island, is offered as an explanation for the variation in the midden composition.

BACKGROUND

St Helena is located in Moreton Bay approximately 6 km from the mouth of the Brisbane River (Fig.1). It consists of a Tertiary basalt core with a maximum elevation of 21 m at the southeastern corner. This core is flanked on its western and southern sides by beach ridges of two broad ages of accretion. The inner east-west trending ridges of red sand which form a platform of slightly over 4 m in elevation have been considered Pleistocene in origin; whereas the more coastal ridges are considered to be Holocene developments (Jones *et al.* 1978). Beachrock occurs for about 500 m along the southwestern margin of the island and overlaps the inner platform. The island covers an area of approximately 92 ha above high water mark. Mudflats form a wide supra- and inter-tidal fringe extending nearly 1 km from the southeast end.

Since 1867, when the island became a penal settlement, its topography has been extensively modified by clearing, draining, filling, quarrying and ploughing. The original vegetation of the island was mainly subtropical rainforest. Flinders (in Steele 1972:21), Cunningham (in Steele 1975:10) and Rawnsley (1865) made reference to the dense vegetation on the island prior to European settlement. Surveyor Rawnsley also observed native wells and a 'natural paddock' towards the southwest corner, which, he speculated, may have once been a lagoon.

Following the closure of the prison in 1932, the island has been leased for grazing and recreational purposes. In September 1980 it was declared a

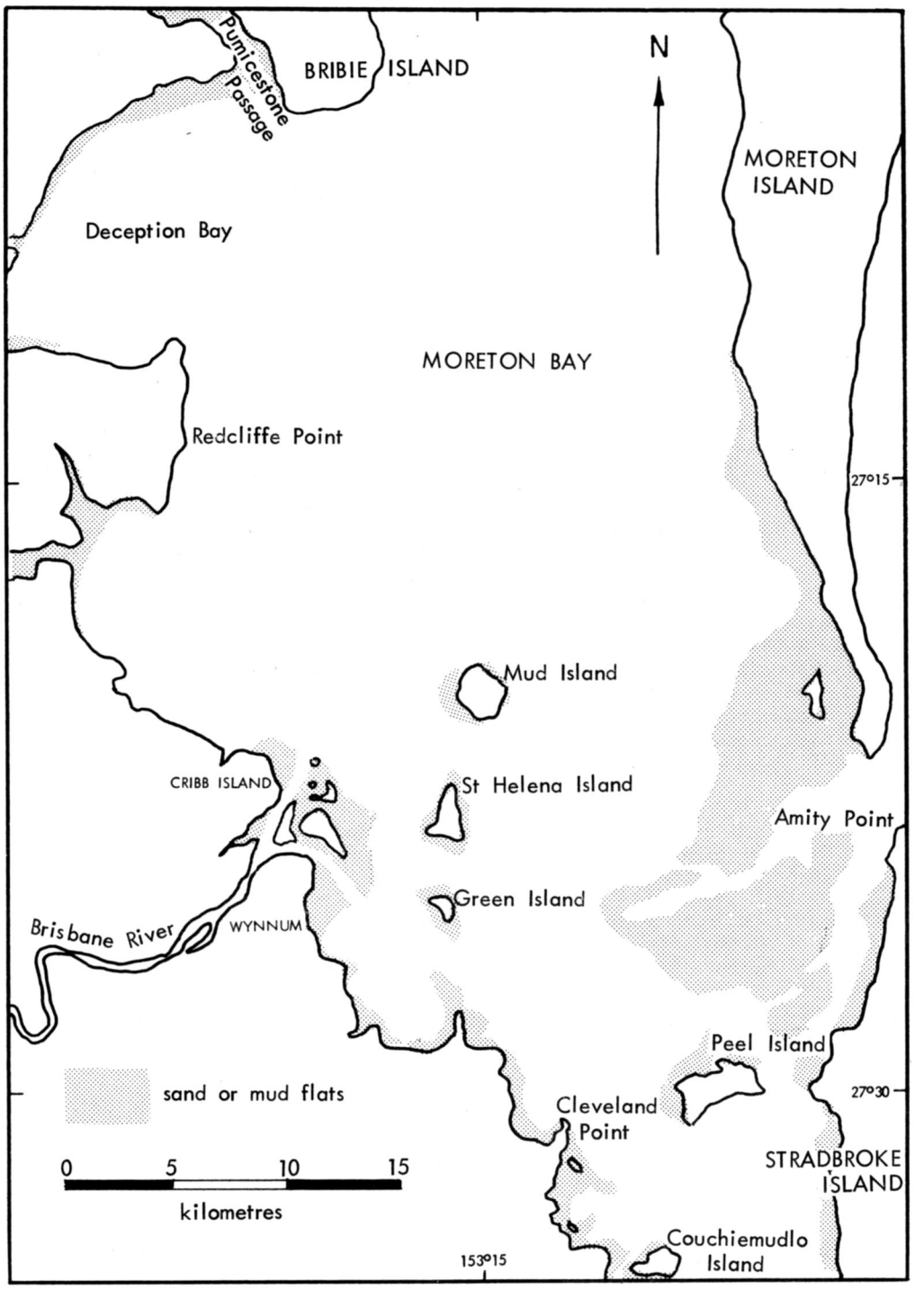

Figure 1. Moreton Bay (adapted from Joint Operations Graphic Series 1501)

National Park except for 13 ha at the northern extremity which were set aside for broadcasting purposes. In December that year Morwood (n.d.) identified and recorded two Aboriginal sites - a midden (LB:C52) and a 'stone working midden' (LB:C53) on the southern end of the island (Fig.2).

Historical references to the Aboriginal use of St Helena Island mention the exploitation of 'flying fox' (fruit bat). Fairholme (1856:312) writes:

> On the coast of Moreton Bay the natives live principally on fish, and the arrival of the flying foxes on the little island of St. Helena is hailed by them as a change of diet. The flights occur only in the warmer months of the year...

Petrie (1975:89) also remembers:

> St. Helena was a great camping place for them [flying fox] in those days, and the blacks from Wynnum used to go across in their canoes to catch them there, watching for calm weather both to go and return.

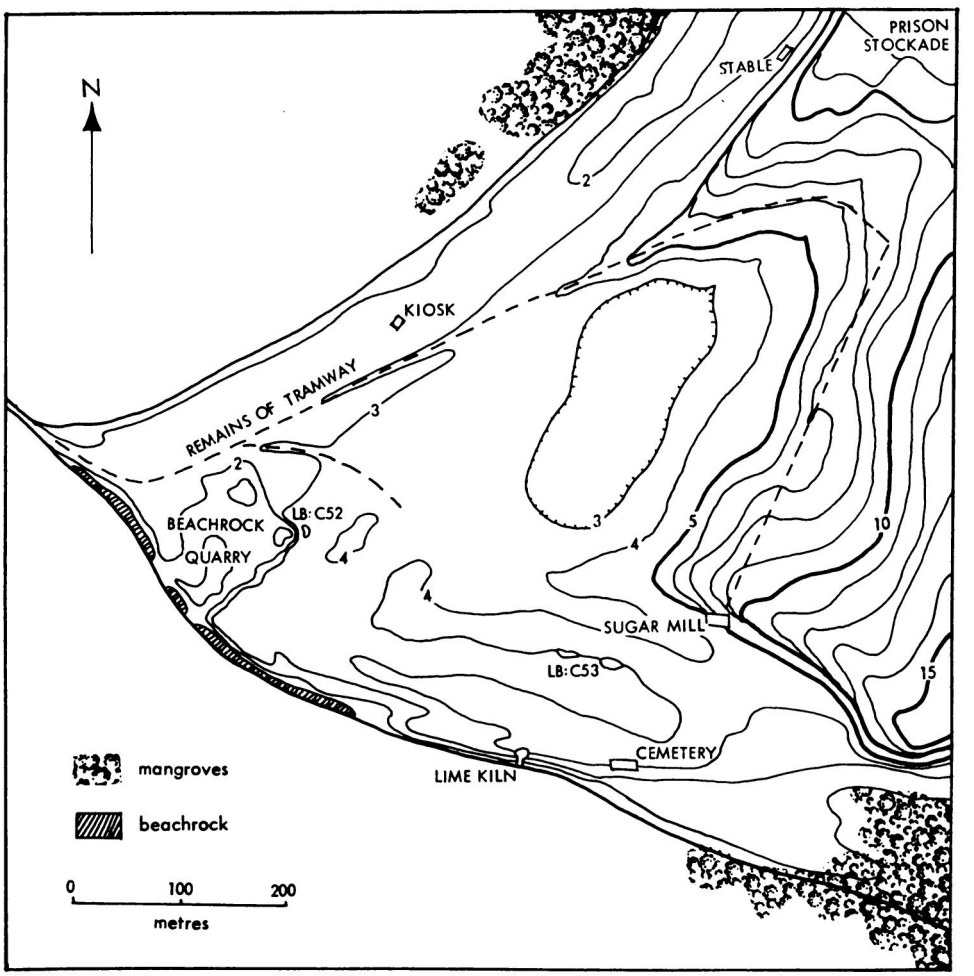

Figure 2. Southwest St Helena Island (adapted from St Helena (Special) Map prepared by the Department of Mapping and Surveying)

In order to contribute further information towards the management plan for the island, I undertook a survey and a small excavation.

THE SITES

Several ungrassed depressions in the east-west trending ridges have deflated scatters of stone artefacts and shell. The largest of these (LB:C53) has an artefact density of up to 15 per m^2. The artefacts consist of flakes, cores and broken grindstones, many of which exhibit cortex. There is a wide variety of raw material presented - silcrete, quartzite, chert, mudstone and quartz. A bed of cobbles and pebbles lying off the southern shoreline is an obvious source of raw material, which is verified by the many waterworn flakes which can be found in the inter-tidal zone.

A cross-section of the midden (LB:C52) nearly 50 cm in depth and 30 m wide has been exposed in the face of the old beachrock quarry used in the early days of the penal settlement to provide building material. The midden shells which previously overlaid the beachrock were probably burnt in the prison lime kiln. Observation in eroded patches and augering have established that the midden extends about 500 m along the beach ridge on which it is located, but it has been increasingly disturbed and scattered by roadworks, tramway bedding and ploughing north from the intersection of the beach ridge and the line of the former tramway (Fig.2). The exposed stratigraphy appears relatively uniform horizontally, and vertically exhibits varying degrees of shell density and fragmentation, but no sterile layers. A marked increase in shell density occurs midway through the deposit. Predominant species of shell are oyster (*Saccostrea commercialis*), mussel (*Trichomya hirsuta*) and whelk (*Pyrazus ebeninus*). These are embedded in a dark grey sandy matrix. Coral and bone - fragments of the long bone of fruit bat, dugong and fish vertebrae - are also visible in the section.

EXCAVATION

In late October 1982, a 50 x 50 cm test pit was excavated adjacent to the thickest portion of the exposed section. A 10 litre bucket was used as an excavation unit (Johnson 1980). Each excavation unit was weighed and approximately 25% of the material was bagged unsieved for mechanical sieving in the laboratory. The rest was sieved using a 2 mm mesh and bagged.

ANALYSIS

Despite the fact that inferences derived from such a small test pit are extremely limited, and although the analysis of the material is still in progress, some preliminary observations can be made. The shell density increases steadily to units 8 to 10 where the shell is about 50% by weight of the deposit. From units 11 to 16 the shell decreases rapidly from 20% to 3%.

The excavated bone is very fragmented. The only large pieces are of dugong, while over 40% was recovered from the 2 to 4 mm size class. This is hampering identification; however, fruit bat (*Pteropus poliocephalus*) and fish, predominantly of the *Sparidae* family, are represented throughout the deposit. The total weight of bone retained by the 2 mm sieve was approximately 290 gm for 48 cm of deposit analysed. This figure is equivalent to about 2400 gm per m^3 which is the same as the estimated bone density for SQD of Bowen Island in New South Wales (Blackwell 1980). The distribution of the bone throughout the deposit is interesting. The average percentage of bone in the total material greater than 2 mm from units 2 to 10 is only about 0.4%, whereas from units 11 to 16 it rises steadily from 1% to 10%. The mud whelk also shows a definite change in representation throughout the

deposit. In units 11 to 16 it comprises from between 7% and 10% by weight, while in units 2 to 10 it ranges from 15% to 21% by weight.

A feature of this midden is the large percentage of coral (mainly *Acropora* spp.) and reef-forming algae (*Lithothamnia* sp.), over 6% by weight, distributed fairly evenly throughout the deposit. Although it has been suggested that this indicates storm wave disturbance (Hughes and Sullivan 1974), in this case I would suggest it represents incidental gathering with the shellfish. St Helena is fringed by a coral reef and dead coral reefs form a base for the attachment of clumps of mussel and oyster. The harvesting of small amounts of coral is therefore to be expected. Also, the presence of small amounts of charcoal and the fruit stones of the blueberry ash (*Elaeocarpus reticulatus*), and a negligible non-economic shell component (about 1% of the analysed material) would indicate that no reworking has taken place.

RADIOCARBON DATES

Two 80 gm samples of *Saccostrea commercialis* were taken from units 9 and 13 for radiocarbon dating. Unit 9, between 18.5 and 21.5 cm in depth, was the unit with the densest shell; and unit 13, between 33 and 36 cm in depth, was the deepest unit which contained sufficient whole shell for radiocarbon dating. The conventional, corrected (Polach *et al.* 1978) and calibrated (Klein *et al.* 1982) values are listed in Table 1.

Table 1. Radiocarbon dates from LB:C52, St Helena Island

Unit	Sample	Conventional age BP	Corrected age BP	Calibrated age BP
EU 9	Beta-6140	1370 ± 60	920 ± 70	870 ± 150
EU 13	Beta-6141	2240 ± 70	1790 ± 80	1730 ± 210

DISCUSSION

The uncorrected value of Beta-6141 is close to an uncorrected radiocarbon date 2540 ± 80 BP (GaK-4770) obtained from shell in beachrock 2 m above MSL on the eroding southern shoreline (Lovell 1975). This suggests that St Helena's resources were being exploited during the period when the seaward margin of the beachrock was still in the process of formation. A waterworn flake embedded 20 cm from the top of a slumped piece of beachrock substantiates this.

The younger date Beta-6140 closely correlates with an uncorrected date of 1300 ± 90 BP (Beta-3226) also on shell collected from the basal layers of a midden on a beach ridge at the present shoreline at Cribb Island, a suburb just north of the mouth of the Brisbane River (B. Ward pers. comm.). This date documents the minimum age for the beach ridge formation on the coastal margin of the prograding deltaic plain. It is suggested that this period of alluvial sediment deposition saw not only the final infilling of the former delta but also the general shallowing of the bay margin with a build-up of the mudflats opposite the mouth of the river and around the island (Hekel *et al.* 1979). This build-up of mudflats would have greatly enhanced the island's littoral resources. Although the shallower water within the island's fringing reef would have always provided good fishing, an increase in the mudflat area would have increased the potential shellfish habitat, and in turn, the potential availability of this resource. This appears to be supported by the increase in the shell component of the midden deposit. More specifically, there is a marked increase in the

proportion of mud whelk (*Pyrazus ebeninus*) which, as a browsing creeper, is a better indicator of the presence of mudflats than the filter feeding mussel and oyster.

Exploitation patterns are also likely to have been considerably influenced by the risk involved in the water crossing in the one-piece sewn bark canoes documented historically (Petrie 1975:97-99). This is relevant as Moreton Bay is capable of producing wind gusts of up to 35 knots with accompanying high waves. Through the period of marine transgression the water crossing from the Wynnum hills to St Helena would always have remained about 6 km, but the subsequent build-up of the mudflats would have considerably decreased the risk of the crossing by lessening the distance at low tides. When the mudflats are exposed, the water crossing between the mangrove-covered islands at the mouth of the Brisbane River and the mudflats of St Helena is no more than 2 km, and even less from Green Island if the island-hopping route from Wellington Point is used. In the lower levels of the midden (units 11 to 16) there is a much higher proportion of fish and bat bone compared with the shell component. This agrees with Sullivan's (1982a: 132-142 and 1982b) observation that offshore islands involving risk of access exhibit an emphasis on the exploitation of specific resources. When it is suggested that the mudflats developed, the composition of the deposit changes to a much higher proportion of shell, agreeing with Sullivan's (1982a:131 and 1982b) observation that islands in protected waters that require no major effort to reach have middens resembling in composition those on the mainland.

With only two radiocarbon dates, only hypotheses can be advanced as to the increased rate of deposition and intensity of site use (Sullivan 1982a: 138 and 1982b) though seasonality studies may provide an insight into the duration of visits to the island or its possible occupation. However, from the analysis of the midden so far, there appears to be a distinct relationship between the build-up of the mudflats and its composition. More geomorphological information is required to establish the regional history of sediment accumulation and further excavation and analysis is required to determine how representative this test pit is of the rest of the undisturbed midden.

The Holocene post marine transgression period saw dramatic changes in coastal productivity, particularly in wide low relief margins of continental shelves. The infilling of estuaries created in drowned river valleys produced marked changes in biological productivity which in turn influenced the resources available to hunter gatherers (Perlman 1980). The relationship of the exploitation of St Helena with the mainland and large Moreton Bay island economies also needs investigating so that other variables such as resource stress and population increase can be assessed. From the data available at this stage, however, a model involving environmental change producing an increase in resource availability and a decrease in exploitation risk provides a testable explanation for the variability in the midden composition.

ACKNOWLEDGEMENTS

This investigation forms part of a BA(Hons) thesis and I have had an enormous amount of help from a great many people in a wide variety of university and government departments. My family has also provided a source of willing field workers and laboratory assistants. The Archaeology Branch of the Department of Aboriginal and Islanders Advancement paid for the radiocarbon dates, without which much of the above speculation would not have been possible. National Parks and Wildlife Service provided logistic support and allowed me access to relevant material in their files. I am indebted to J. Hall, P. Hiscock, R. Neal, L. Satterthwaite and I. Walters of the University of Queensland, M. Rowland of the Department of Aboriginal and Islanders Advancement, M. Sullivan of the NSW National Parks and Wildlife

Service and W. Ward of the CSIRO for constructively criticising earlier drafts of this paper.

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