

**DATING OF RECENT LOW SEA LEVEL AND MAORI ROCK CARVINGS
ONGARI POINT****J. C. SCHOFIELD****New Zealand Geological Survey, Otara Road, Papatoetoe**

Abstract

A sea level of at least 1.5ft below the present one, and contemporaneous rock carvings have a radiocarbon date of 180 ± 50 years B.P.

INTRODUCTION

Carvings on the face of a pumiceous sandstone sea-cliff at Ongari Point were discovered by the writer in 1961. There are two types — incised drawing and bas-relief carvings. Reasons were given (Schofield, 1962) for separating these into two distinct periods — the incised drawings being associated with a missionary station established nearby in 1842, and the bas-relief carvings being considered older. Now that a radiocarbon age is available this note describes more fully the evidence that leads to the conclusions that the bas-relief carvings were executed approximately 200 years ago and that at the same time sea level was 1.5ft or more below its present level at Ongari Point.

EXCAVATIONS

Ongari Point (the true spelling according to Ambrose (1961)) or Ongare Point (as is given on N.Z.M.S. 1 Sheet N53 and Part N54) lies on the west coast of the Tauranga Harbour (Figure 1). The bas-relief carvings are found cut in cliffs of pumiceous sandstone at N54/453816 in one of the few areas where coastal cliffs are protected from coastal erosion by a narrow beach fronting a shallow vegetated storm ridge. Immediately behind this ridge is another ridge close to and parallel with the slightly overhanging cliffs (Figure 1). Excavations show that this ridge, in its upper half, is mainly built from sandstone fragments and midden material that has probably fallen from the cliff edge above. The surface of this ridge slopes towards and abuts against the cliff face and against the roofs and sides of "cave dwellings" which have become almost completely filled with the same debris.

In 1961 two small excavations were undertaken, one at locality A (Figure 1) beneath the bas-relief carvings, and the other at B in the entrance to one of the "cave dwellings". There was insufficient charcoal obtained for dating from the occupation layer (A9) and thus in 1963 a further excavation (locality C, Figure 1) was carried out 3ft south of locality A when a number of twigs were obtained from the same layer.

Excavation A

Locality A lies against the cliffs immediately below the bas-relief carvings that reach ground level at this point (Figure 1). The section exposed along the north wall of the excavation consisted of nine layers, A1 to A9 from top to bottom (Figure 2).

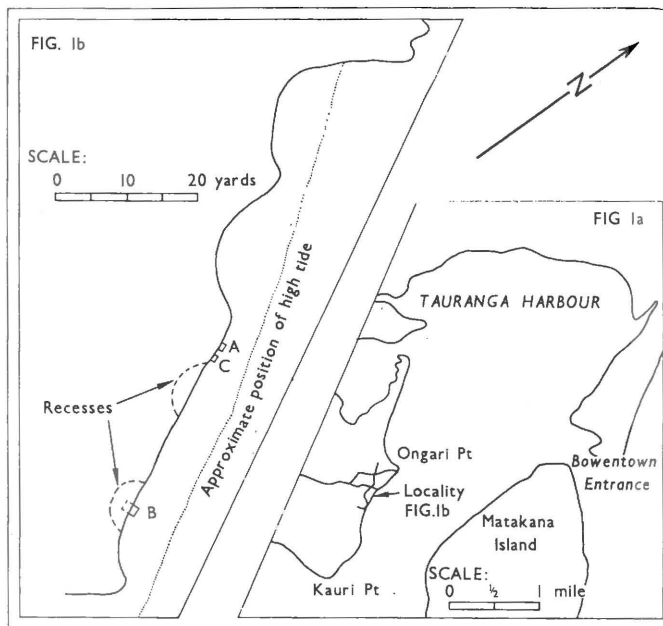


Figure 1. Locality plan; Figure 1b is a sketch only, the distances along the cliff-line being measured by paces.

- | | | |
|----|--------------|---|
| A1 | 0in. to 3in. | brown earthy material containing broken bottle glass and wire
<i>grading into</i> |
| A2 | 2in. | ditto, but containing about 50 per cent angular fragments of pumiceous sandstone
<i>grading into</i> |
| A3 | 4in. | similar earthy material but containing uncommon pumiceous sandstone fragments; 50 per cent shell of which 25 per cent is whole, some charcoal and uncommon bone material
<i>sharp contact</i> |
| A4 | 1in. to 2in. | clean, creamy-white sandy shell of which about 75 per cent is whole. Rare charcoal, sandstone and fish bones also present. Sand forms about 25 per cent of the total
<i>sharp regular contact</i> |
| A5 | 11in. | dark grey-black, unctuous clay containing about 50 per cent large fragments. These consist of 50 per cent shell fragments with only a small amount of whole shell; 25 per cent charcoal up to 1.0in. in size, 25 per cent angular sandstone fragments up to 0.25in. and rare fragments of fish and bird bones
<i>sharp regular contact</i> |
| A6 | 4in. | clean creamy-white, sandy shell bed containing about 50 per cent sand. Of the shell fraction about 25 per cent is whole including rare bivalves still hinged together and empty. Rare charcoal but no sandstone or bone fragments.
<i>sharp regular contact</i> |
| A7 | 0in. to 2in. | dark grey, sandy shell with about 50 per cent charcoal. Of the shell fraction less than 10 per cent is unbroken including rare bivalves still hinged and empty. Also present are rare sandstone fragments, haangi stones and lumps of fine ash.
<i>sharp regular contact</i> |
| A8 | 9in. | creamy-white, clean, sandy shell in which there is very little sand, 75 per cent of the shells are whole including some hinged and empty bivalves. Angular sandstone fragments, charcoal and rounded pumice stones are rare.
<i>sharp regular contact</i> |

A9 8in. to 12in. coarse, light grey sand containing only about five per cent large fraction which includes common charcoal, haangi-stones, obsidian flakes and rare pumice. Weathered, rounded fragments of sandstone are common, as are angular fragments of the same sandstone, the latter being concentrated near the cliff face. The sand contains only about one per cent shell fragments all less than 0.25in. in diameter. Twigs (radiocarbon sample N54/500) and most charcoal occurs in top 3in. but charcoal is common down to the base of the layer.

sharp irregular contact
 "Natural" consisting of a wave-cut platform in pumiceous sandstone.

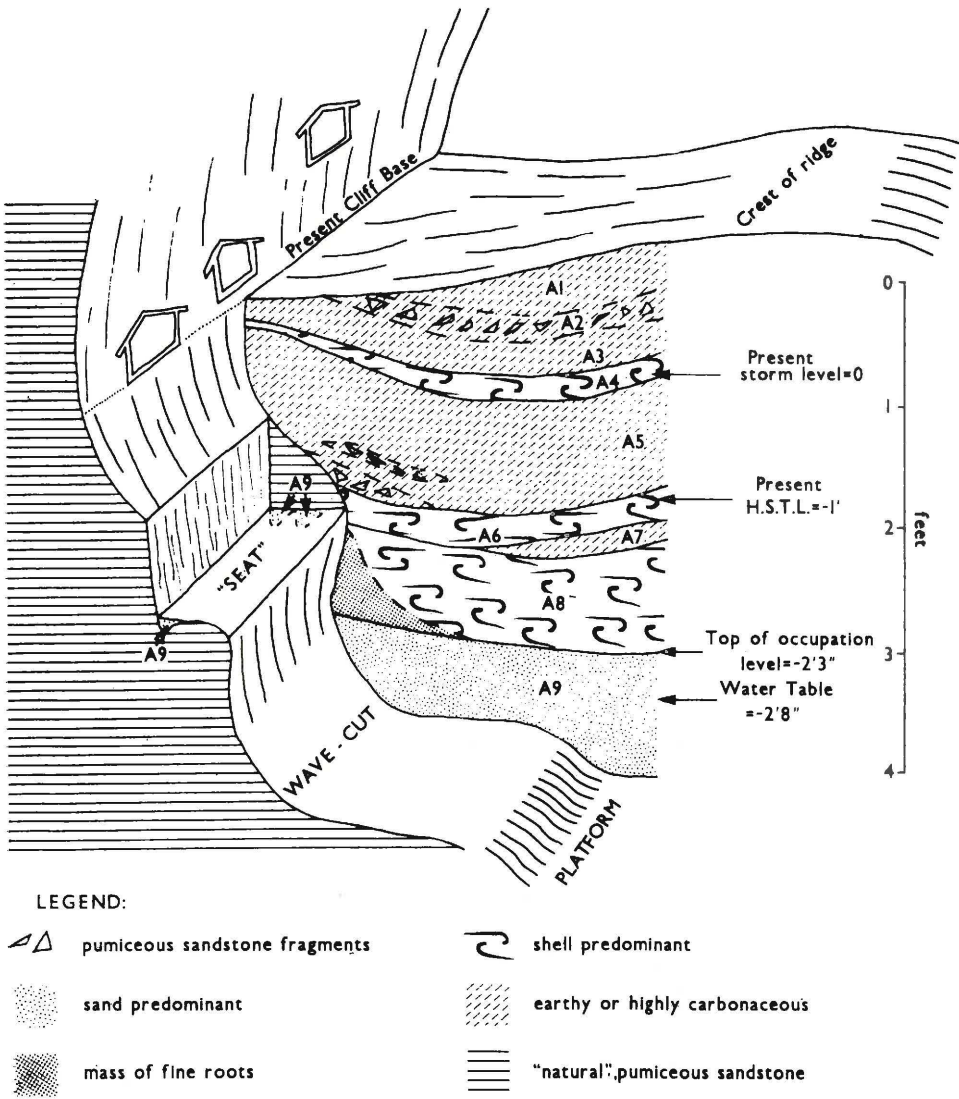


FIG. 2

Figure 2. North wall of excavation A showing the lowest bas-relief carvings (houses) and "seat" or "shelf" hewn into the cliff face in relation to the occupation level represented by layer A9. Crest of ridge more or less underlies the maximum overhang of the cliff.

Artifacts : Apart from haangi stones and obsidian chips (see above) no portable artifacts were found. The slightly buried nature of the lowest bas-relief carving suggested the possibility of further carvings below ground level, but none was found. However, a large artifact in the form of a hewn seat or shelf was exposed in excavation A and found to continue into excavation C and is thus more than 9ft long. Advantage had been taken of a natural projection formed by the meeting of two wave-cut notches (see north wall of excavation A, Figure 2) which is reshaped to provide a platform 1ft wide at a comfortable sitting position above the wave-cut platform and basal layer A9. Grooves in the back and pointed holes in the seat were probably made by the *wauwau* "a pointed stick used as a pick" (Best, 1927, p. 38). The irregularities in the seat were smoothed over by being filled with the same sediment as found in layer A9.

Excavation B

There are at least two recesses that are almost completely filled by a sequence of beach sediments interbedded with man-associated layers. Along the ceiling of both there are preserved marks, possibly made by adze blows, and grooves ending in holes left by the *wauwau*. These marks owe their preservation to case-hardening common in pumiceous sediments.

Because the roof is now insecure and would have required support, excavation B penetrated only 2.75ft into the southern-most of these recesses. Layers B1-B4 (Figure 3) are correlated with layers A1-A7 (see above) and the two basal layers

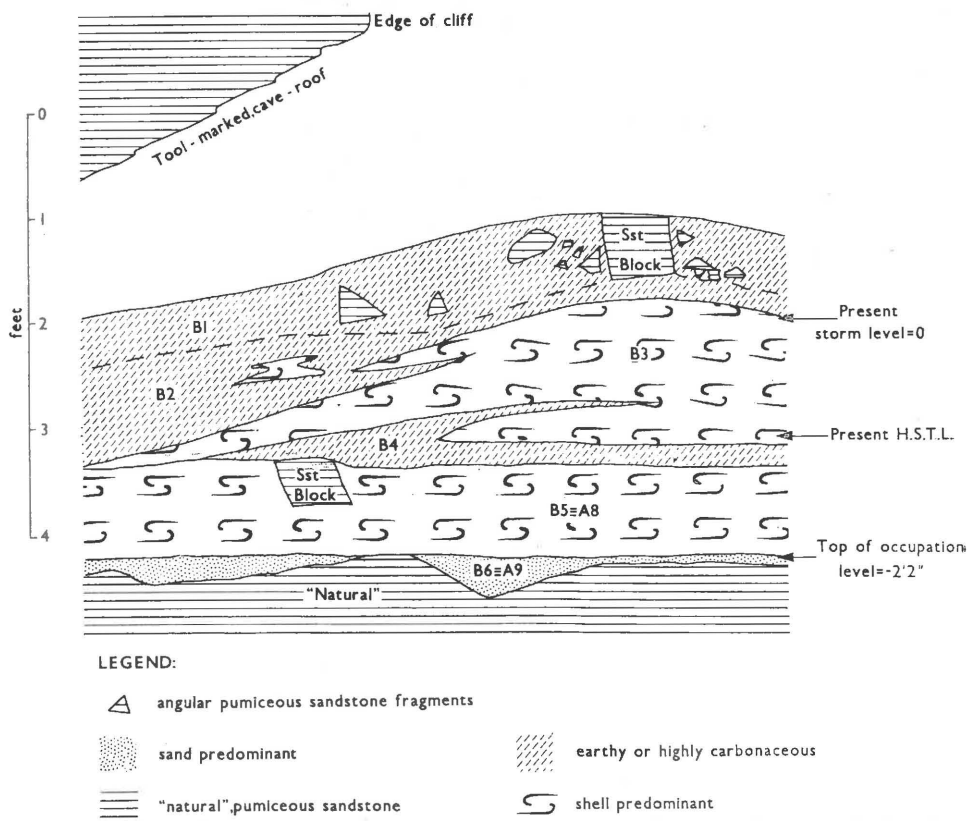


FIG. 3

Figure 3. North wall of excavation B showing relation to the southern-most enlarged recess.

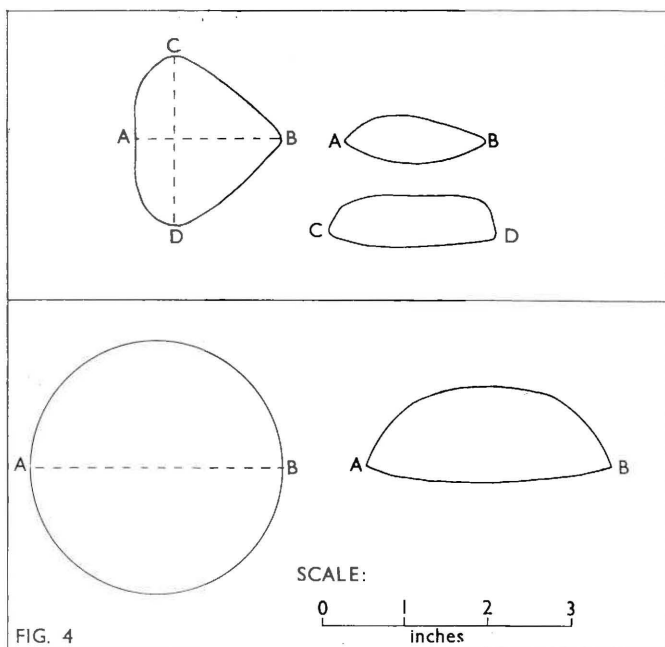


Figure 4. Shapes of pumice "polishing stones".

B5 and B6 are identical to layers A8 and A9 respectively. Haangi stones were common in B6. A 1.5in. wedge-shaped, obsidian flake was found at the base of B5 and two shaped pumice "polishing" stones (Figure 4) were found at the top.

Layer B6 fills the irregularities of the wave-cut platform cut in the "natural" — the levelled floor being 5ft below the roof of the recess at its entrance and 3.5ft below at a distance of 2.75ft inside.

ORIGIN OF LAYERS

The relatively high charcoal content and dirty or earthy nature of layers A1, 2, 3, 5, 7, 9 and B1, 2, 4, 6, together with the presence of some bird and fish bones, haangi stones, and obsidian flakes show that these layers are man-associated. They are quite distinct from the clean, sandy shell layers of A4, 6, 8 and B 3, 5 which contain only very rare man-associated fragments such as charcoal and the artifacts from B6.

Man-Associated Layers

The man-associated layers are present in two varieties — "an occupation layer" (A9 equal to B6) and younger "accidental layers" (A1, 2, 3, 5, 7 and B1, 2, 4).

Occupation layer: The association of layer A9 (B6) with man is shown by the common occurrence of charcoal and the presence of obsidian flakes, and haangi stones which show the unnatural mixture of rounded and sharply angular edges resulting from round stones being fractured by fire. This layer is a light grey colour and appears dirty when compared with the creamy-whiteness of the local beach sand. Also there is an almost complete absence of shell fragments common in present-day beach deposits and in the immediately overlying beds A8 and B5. On the other hand the occupation layer differs from a midden by being almost pure sand and differs from the accidental layers, described below, by being far cleaner. It is thus interpreted as the floor of an occupied site, the sand perhaps deliberately carried in by the Maoris, a method that is still adopted by some Samoans to keep their living sites clean and tidy.

Accidental layers : The accidental layers (A1, 2, 3, 5, 7 and B1, 2, 4) are of interest for two reasons. They are unlike normal middens in that their shell content is a maximum of 25 per cent with whole shells uncommon. These facts together with other features such as lenses of angular sandstone fragments and their position below an overhanging cliff edge suggest that the material has fallen from the cliff top, either deliberately thrown or rain-washed from middens farther inland.

Table 1. Whole shell percentages.

<i>Man-associated layers</i>		A3	A7	B2
<i>Amphidesma australe</i>	...	16% (1.25 - 2.0in.)	3%	13% (0.5 - 2.5in.)
<i>Chione stutchburyi</i>				
One valve only	...	38% (0.5 - 0.75in.)	15% (0.25 - 0.75in.)	49% (0.25 - 1.25in.)
Both valves hinged	...	...		2% (0.5in.)
Gasteropods	...	46% (0.25 - 0.5in.)	82% (<0.75.)	35% (0.25 - 1.0in.)
<i>Beach layers</i>		A4	A6	A8
<i>Amphidesma australe</i>	...	9% (1.0 - 2.5in.)	3% (0.75 - 2.0in.)	16% (1.5 - 2.5in.)
<i>Chione stutchburyi</i>				
One valve only	...	50% (0.5 - 1.25in.)	67% (0.5 - 1.0in.)	65% (0.25 - 1.25in.)
Both valves hinged	...	...	3%	2%
Other pelecypods	...	...		2%
Gasteropods	...	39% (0.25 - 0.5in.)	27% (0.25 - 0.75in.)	14% (<0.75in.)

The second factor of interest is the smallness of the shells. The diameters of the cockles (*Chione stutchburyi*) range from 0.25 to 1.25in. but are generally less than 1.0in. (Table 1). The length of the pipis (*Amphidesma australe*) range from 0.75 to 2.5in. rarely attaining a length of 4.0 in. Very small unbroken gasteropods, normally less than 0.5in. are also common (greater than 35 per cent, Table 1) and belong to the same habitat as the cockles and pipis (Dr Powell, pers. comm.). Although the writer has observed similarly small shell-fish used for food in some of the Polynesian islands, the smallness of these shells need not mean that larger shellfish were not obtained for eating. On the other hand, the high percentage of very small gasteropods suggests that these shells may have an origin other than kitchen refuse. A direct origin from the sea is improbable as it seems more likely that a brief incursion of the sea would form a clean deposit such as the thin layers of A4. However, the percentages of the various shell types within the accidental layers are close to those considered to be beach deposits (Table 1) and thus there could be some indirect connection. Perhaps it represents the coarse fraction that has been sieved from the beach sand to leave sand suitable for flooring nearby living sites. Supporting evidence for this postulate lies in the maximum size of the uncommon shell in A9 and the minimum size for shells in the accidental layers — both are 0.25 inches.

Beach Layers

The clean sandy nature of the shell beds A4, 6, 8 and B3, 5 and rarity of charcoal make them almost certainly natural beach deposits. Furthermore, the almost sand-free nature of layer A8 makes it either a storm or high-tide deposit (Schofield, 1960) and is the first recorded invasion of the sea to disturb the occupation site. The artifacts in B5 were probably picked up from the occupation floor by the storm waves that deposited that layer — the heavier obsidian “chisel” remaining at floor level and the lighter pumice “polishing stones” being incorporated at its top.

DISCUSSION

Age of Occupation and Bas-Relief Carvings

The evidence presented above strongly suggests that layer A9 is the only layer associated with man's occupation of the site. The bottom few inches of this layer in excavation C was less dirty than the upper parts, suggesting that sufficient sand was introduced to cover the irregularities of the wave-cut platform and that the upper, dirty portion was built during occupation. Twigs collected for radiocarbon dating (N54/500, N.Z. 874) came from the top three inches of A9 and gave an age of 180 ± 50 years B.P., i.e. A.D. 1770 ± 50 years.

As there are no signs of occupation-floors at higher levels it is probable that the "seat" hewn into the cliff face and the bas-relief carvings were constructed at the same time as A9 was occupied. This deduction is supported by the finding of A9-sand sealing in the irregularities of the "seat" and the finding in A9 of small, angular, fresh sandstone fragments which are distinct from the rolled oxidised pebbles of the same material. Further support is added by the position of the bas-relief carvings relative to layer A9 as compared with their position relative to the present-day surface for whereas they extend from 0 to 3.5ft above present surface level (a most difficult level to carve them from) they extend from 3.0 to 6.5ft above the occupation level of A9. This much more comfortable level for carving ranges from a squatting position to one which would be at arm's length from a standing position. It is also a more pleasing position for the viewer. The incised drawings, on the other hand, are associated with incised copper-plate writing and Roman printing that was probably being taught by the early mission station. They are also at higher levels than the bas-relief carvings, for ground surface at the time of the mission was close to that of the present as shown by European artifacts found only in the top few inches (layer A1 and possibly A2 and A3).

Type of Occupation

A large-scale investigation is required to determine whether or not this site was permanently or only temporarily occupied. The fact that the bas-relief carvings are restricted to carvings of houses suggests perhaps homesickness on the part of the occupants, which would indicate a temporary and perhaps unwilling period of abode. It is interesting to note that most of the later incised drawings feature carefully executed writing, or canoes and European sailing vessels, reflecting perhaps, dissatisfaction with the old way of life after contact with Europeans.

Sea Level

Sea level, relative to the site, must have been lower than its present position but by how much is difficult to decide. The top of the occupation layer A9 is 1.25ft below the level reached by present high-spring-tide and if we allow the top 0.25ft of A9 to have been added during occupation it would suggest sea level was at least 1.5ft below its present position. As stormy conditions of sufficient strength to cause coastal havoc within the sheltered Tauranga Harbour are probably infrequent, temporary occupants of the site may not have been worried by the invasion of the sea during storms and thus the above minimum of 1.5ft may be close to the actual level. If, however, the site was permanently occupied for many years, it is likely to have been above the reach of storm waves which would place sea-level at least 2.5ft below its present position.

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