NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

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THE CONSERVATION OF DENDROGLYPH GROVES ON CHATHAM ISLAND

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As Park (1976) has outlined, there has been concern over the years that the dendroglyphs of Chatham Island have been disappearing through the destruction of the kopi trees. The word 'kopi' is the local Chatham Island name for the karaka tree (Corynocarpus laevigatus). In 1964 there were the following major concentrations of dendroglyph groves:

1. Hapupu: located in the bush immediately south of the former Hapupu airstrip. Simmons (1964) estimated a stand of possibly 300 carvings.
2. Lake Taia area: located about midway along the Hanson Bay coast, an area of about 100 carvings.
3. Makeroa: situated on the northern narrow strip of land that separates the sea from Te Whanga lagoon.

Of these concentrations only the Hapupu and Lake Taia stands remain today.

The timespan for the disappearance of the Makeroa grove gives a good indication of the speed with which a small grove can be killed off. Simmons (1964) estimated the 100 m long grove contained about 180 carvings which were on the verge of being beyond recovery. When Kelly (1971) saw the grove in 1968-69, he considered the trees were beyond saving. When Park (1976) visited the spot the grove as such had ceased to exist.

The main causes of destruction are clearing, followed by animals (Simmons, 1980). The farm stock (cattle, sheep and horses) also severely limit regeneration by eating the seedlings. Although I did not witness it myself several local residents said that cattle, in particular, liked eating kopi leaves and in summer, when pasture grass can be in short supply, the leaves were a regular food.

There are also opossums on Chatham Island and while they may not feed on kopi they can limit the growth of other vegetation and so hinder effective regeneration. They were first liberated in the late 1920s and for a few years increased rapidly (Wodzicki, 1950:22). Hawkey (1957a) noted that they were "unfortunately ....fairly numerous" in the Hapupu kopi grove. However, by January 1979, the time of my first visit, the density of opossums must have been significantly less because local residents claim that opossum sightings in the kopi groves, or on the road-sides, were few and far between.

This observation by local residents is supported by Wildlife Service Officers. Mr D.V. Merton (pers. comm., 1981), a Wildlife Officer who has frequently visited the Chathams, stated that, "although opossums are widely distributed over Chatham, their population density appears to be very low and they would not have a significant detrimental effect on the kopi groves." Merton also noted that the most probable factor for the low density of opossums was that the land is not prime opossum habitat.

To the destruction caused by animals one must also consider natural processes which, although they do not kill a tree, gradually cause the dendroglyph to become obliterated or disappear altogether. Such processes include the growing cover of lichen and the natural response of damaged tree tissue to carry on healing itself. This latter point is interesting and will be referred to later.

For some time the Department of Lands and Survey has also been aware of the degeneration of bush cover in the Chatham Islands and the danger of losing dendroglyphs on the main island of Chatham. Referring particularly to the dendroglyphs in the Manuaea-Makeroa area, along the northern coastal strip of Te Whanga Lagoon, Hawkey (1957a, 1957b) clearly anticipated their demise and, at the time, he put forward a strong recommendation for their preservation by the creation of fenced-off reserves.

More recently the Department of Lands and Survey has initiated an extremely important programme aimed at conserving and facilitating the regeneration of the island's flora. This programme is based on establishing a number of reserves throughout the whole island group. The decision where reserves should be located has its foundation in a botanical survey of the islands, made in 1968-69, by Mr G.C. Kelly of the Botany Division, D.S.I.R. Kelly's work specifically produced recommendations for a number of reserves which, overall, would help conserve a wide range of vegetation types. For the kopi dendroglyph groves this was very important because the major carving stands also coincided with established or intended reserves.

Land for reserves can be obtained in several ways:
1. Land may be given as a gift, e.g. the Hapupu grove, given by Barker Bros. of Kaingaroa.
2. Crown land may be used, e.g. the 400 ha block at Rangaika on the southern coast of Chatham Island facing Pitt Strait.

3. The Crown can purchase privately owned land, outright, if the owners are agreeable to sell it.
4. A reserve can be created on private land with the owner's consent but a conservation covenant is placed on the title deed. Under this system the owner still retains full ownership of the land but the title deed becomes bound by the covenant so that the reserve can be protected by the Reserves Act.

So far the reserves programme has been successful. It was a relatively straight forward matter to have the small islands designated as reserves. On Chatham Island and Pitt Island progress has been steady. Pitt Island, for example, has now a total of 1,539 ha designated for reserves. On the main island, Chatham, the following important reserves have been established and of these only the Rangaika reserve does not contain dendroglyphs.
1. Taia Bush Scenic Reserve - 12 ha, fenced off in 1974.
2. Lake Kairae Reserve - 15 ha, fenced off in 1975.
3. Hapupu Historic Reserve - 24 ha, fencing completed November-December 1980.
4. Rangaika Scenic Reserve - 400 ha, fenced off March 1981.

The effect of fencing off groves

1. The Lake Taia Reserve. When Park (1976) visited the Taia Reserve it had been fenced off for about two years. He noted: "The undergrowth at Taia is a marked contrast to the Hapupu situation. There are many seedlings of kopi and matipo (Myrsine australis) as well as other smaller plants. The margins of the stand are still rather exposed as a result of grazing before the installation of the fence, but both the native plants and deliberately planted pines are growing up to protect the exposed edges once more ... Aerial photographs and Simmons' records show an area of dead trees at the southern end of the bush, whose extent had clearly been increasing from at least the 1940s until after Simmons' visit. It seems very likely that this process has been stopped and probably reversed."

Since 1976 the Taia Grove has developed a great deal further. What was once a barren southern extension is now an active area of regenerating bush (C. Hosking, pers. comm., 1981).

2. Hapupu Historic Reserve. When I first visited the Chathams in January 1979 the Hapupu Grove was not fenced. The area was all but devoid of ground cover beneath the kopi. Even the stinging nettle (Urtica australis) was absent. In other bush areas on the island this nettle is common. The southern and

coastal sections presented a picture of dead trees lying where they had fallen on their own accord after rotting or, as I observed on two occasions, pehaps a few had been pushed over by cattle trying to satisfy an itch. The pasture grass of the exposed fringe area was thinly distributed and its struggle for survival was accentuated by the summer heat. To a lesser extent there were a few patches denuded of topsoil, presumably blown away by the wind. It was essentially a repeat scene of the Taia Reserve before it was fenced.

When I returned to the Chathams in February 1981 I learned that the fencing of this grove had been completed over the period November-December 1980. The results are already apparent: the ground cover is steadily returning in all places, a variety of seedlings (especially kopi) are appearing throughout as firmly established plants and many kopi trees are sprouting series of shoots at the base of their trunks (Plates 1 and 4). But perhaps the most dramatic change can be seen in the large number of seemingly dead trees which are sprouting back to life at the base of the trunk or in other parts of the tree (Plate 2). In a few cases a 'dead' log or branch lying on the ground had also sprouted (Plate 1). Hawkey (1957b) also reported the dramatic change that can take place when adequate protection is given:

> "about seven years ago (a local farmer) fenced off about one hundred acres of dead and dying bush which was probably in the poorest condition of any on the Island. Some effort was made to provide shelter by planting flax around the fence lines. The results have been truly amazing; trees seemingly dead for years have sprung to life, and everywhere there has been a heavy regeneration of every species."

Conservation of dendroglyphs

There are really only three alternatives that govern what conservation measures need to be taken:

1. the dendroglyphs can be left in situ, or
2. they may be removed from the tree, or
3. a compromise of (a) and (b).

Dendroglyphs left in situ. The case that "the significance of the carvings has a lot to do with their situation, and their beauty can only really be appreciated in the bush" (Park, 1976), is a strong one having a deal of emotional as well as scientific validity. The fact that fencing off areas has produced such readily observable results must surely strengthen this view.

However, the question must now be asked: if the dendroglyphs remain *in situ* how long will it be before they become unobservable and lost for the future? The long term effect of moss and lichen growth can be damaging, for their survival is based on the slow destruction of the integrity of the *kopi* bark.

In his survey of 1963-64 Simmons solved the moss-lichen problem by careful removal with a wire brush in order to locate dendroglyphs. Even then, however, the 46 trees worth recording, in the first 100 yard surveyed square, only provided "possible" carvings. At the conclusion of the survey Simmons noted "we ... had recorded 300 odd possible carvings of which 160 are very definite" (Simmons, ms.a). Admittedly I did not have this survey to guide me, but during my two visits to the Hapupu grove, in January 1979 and February-March 1981, a detailed walk through the *kopi* showed that many of these possible carvings had disappeared.

An additional factor which must be taken into account is the natural ability of *kopi* trees to heal wounds made by carving. When the integrity of the outer bark has been breached to the sap (i.e., the cambium layer; the delicate moist layer which renews the bark of the tree and thereby over the years increases the tree's girth) the initial response is to form callous tissue and seal the wound. The healing process, however, does not stop there. Over the years the gap caused by carving will gradually be closed as the rounded healed edges merge together (Plate 3).

All trees that produce a corky bark slough their bark during the normal process of growth as they increase in their dimensions. The rate at which sloughing takes place differs from species to species. In the case of the relatively smooth-barked *kopi* the rate is probably very slow (J. Dawson, pers. comm.). Nevertheless, it does occur and has probably been an additional major factor for the gradual disappearance of dendroglyphs.

Consequently, if one measures the time from Simmons' 1963-64 survey to my visit in 1981, it seems reasonable to estimate a tentative time-span of 15-20 years for the faint remains of a dendroglyph to eventually disappear from a live tree. A more prominent dendroglyph could well take an additional ten years before it disappeared.

It is ironic that successful efforts to preserve carvings *in situ*, for the future, ensures their eventual disappearance.

Removing dendroglyphs from trees. The only way we can be certain that dendroglyphs will survive in the future is to remove them from the trees. To do so would not involve any major conservation problems (J. Fry, pers comm.) - which, in fact, has already been demonstrated if one notes examples of dendroglyphs currently on display in the Auckland and National Museums.

A compromise would be to remove carvings from dead or dying trees as Park (1976) has suggested. However, in this case the problem now is that seemingly dead trees are sprouting back to life and carvings could easily earn a reprieve. Unfortunately there is no reprieve from the souvenir hunter whose activities have already started in the Hapupu grove (Plate 4).

One must also take into account the feelings of local Chatham Island residents. Removal of dendroglyphs is likely to cause local concern, especially if carvings are permanently taken from the island. This feeling is reinforced to some extent by rumours of making the Chathams a summer tourist attraction now that a new all-weather airport has been opened. A worthwhile trip for any visitor would be to see the kopi dendroglyphs. Whether there is any substance in these rumours remains to be seen.

A compromise solution. Considering the inevitability that dendroglyphs will disappear if left in situ, when the most sure method of survival is removal, at best all that can be hoped for is a compromise solution which should be discussed with the Chatham Islanders and which will be effective for about the next twenty years.

Based on previous work done, e.g., Jefferson (1956) and especially Simmons (1964, 1965, 1980), there is enough data to decide on a selection of dendroglyphs important enough to be removed from their trees and undergo conservation treatment. The dendroglyphs should then be placed in the local Chatham Island museum. The remainder of the dendroglyphs would then be left in the groves to live out their natural lifespan.

In addition, the following by R. B. O'Rourke (1981, pers. comm.) is worth considering. He suggests:

> "If the proposal, to remove dendroglyphs to a museum context for permanent preservation is adopted some thought might be given to the feasibility of replacement replicas being grafted back on the host trees.

In consultation with the Forestry Service, experiments could be conducted for the obtaining of moulds, *in situ*, or after the removal of specimens, their replication in fibreglass and return to the donor trees. Subsequent cosmetic treatment should also be given serious consideration."

Conclusion

We are seldom fortunate enough to have a timespan of up to twenty years in which to undertake a salvage programme. So we have a unique chance to save these dendroglyphs well and truly for posterity. I believe moves should now be taken to adopt the compromise solution outlined above.

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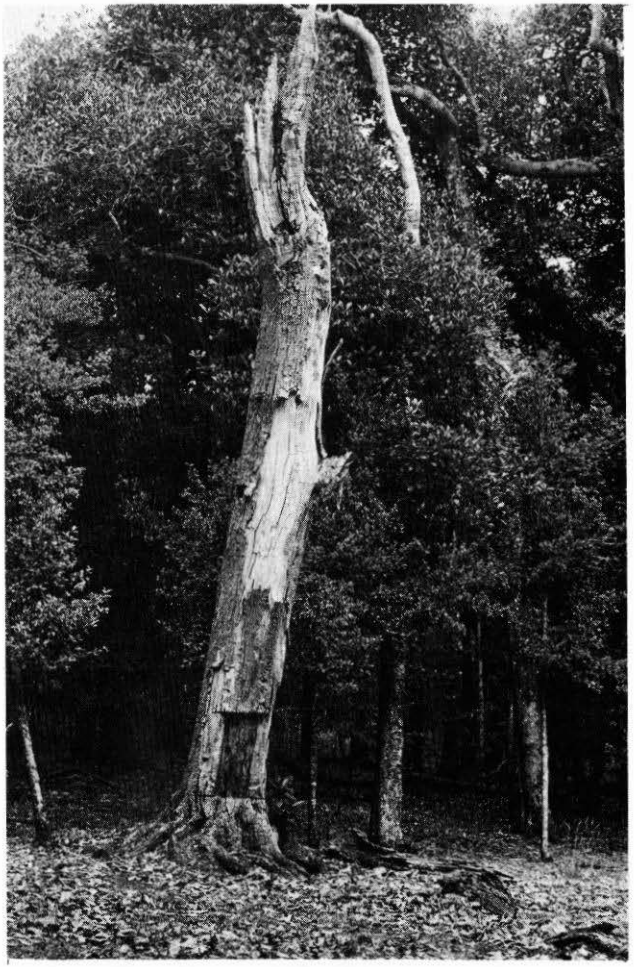
DENDROGLYPHS Plate 1. Hapupu—regenerating kopi trees.

DENDROGLYPHS Plate 2. Hapupu—a kopi developing new growth.

DENDROGLYPHS Plate 3. Showing rounded margins of natural tissue (Nat. Mus.).



DENDROGLYPHS Plate 4. Hapupu—a dendroglyph has been removed by chainsaw.