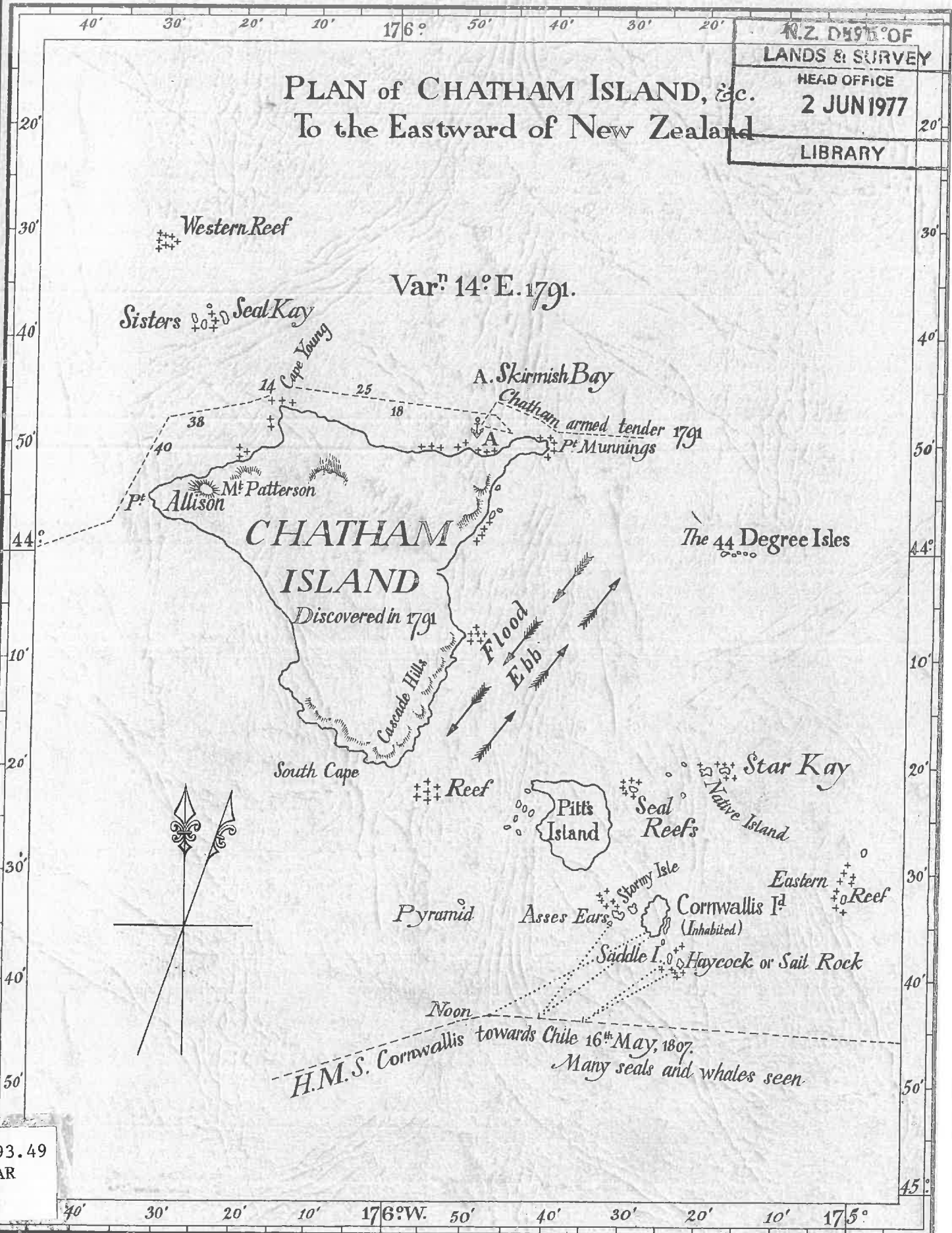


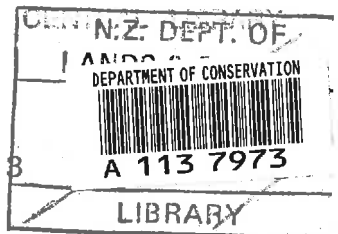
WORKING PAPERS IN CHATHAM ISLANDS ARCHAEOLOGY

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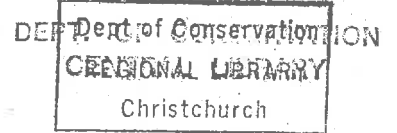


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Working Papers in Chatham Islands Archaeology 8



THE DENDROGLYPHS AND PETROGLYPHS OF THE CHATHAM ISLANDS

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Foreword

The third working paper in this series was, like the first, written as a report to the New Zealand Historic Places Trust. Stuart Park summarises his fieldwork and that of earlier researchers, discusses the results and makes pertinent recommendations for action necessary to ensure the preservation of at least some examples of the unique prehistoric art forms of the Chatham Islands.

It is to be hoped that the inclusion of his report in the series will alert a wider audience to the magnitude and importance of the problem, and result in effective action being taken.

D.G. Sutton
Acting Editor

Earlier papers in the series are:

1. Smith, I.W.G. and P. Wernham "Survey of Archaeological Sites: Te Awapatiki to Hapupu, Hanson Bay, Chatham Island." 1976
2. Weiss, Dr. B. (translated K.J. Dennison)
"More Than Fifty Years on Chatham Island". 1976

Further titles are in preparation.

The Dendroglyphs and Petroglyphs of the Chatham Islands

G.S. Park

The graphic art of the Moriori people of the Chatham Islands occurs largely in the form of shallow carvings on the bark of the karaka (Corynocarpus laevigatus - known as kopi in the Chathams) and incisions in the soft limestone of the Te One series. Concern has been expressed over the years that much of this art was disappearing through the destruction of the kopi bush and the deterioration of the limestone. In 1975 the matter was drawn to the attention of the New Zealand Historic Places Trust by one of its members, Mrs. A.N. Gale. The Trust suggested to one of the organisers of the Otago University Anthropology Department's Chatham Islands Project, Dr. B.F. Leach, that a survey might be undertaken by one of the people associated with that expedition, with a view to recommending to the Trust necessary action for the protection of the carvings. Accordingly, G.S. Park of Otago Museum was granted the sum of \$423 to undertake such a survey in January and February 1976. Although the survey of the two art forms was carried out concurrently, the problems affecting the survival of the carvings are different in each case. This report deals with each form separately.

Dendroglyphs

The dendroglyphs of the Chatham Islands are reasonably well known. Several early writers discuss and figure them (Travers 1876; Dendy, 1901; Hamilton, 1903; Williams, 1919), and they are discussed at some length by Skinner in the most important studies to date of Moriori culture (Skinner, 1923; Skinner and Baucke, 1928). Most published information however is contained in Christina Jefferson's monograph (Jefferson, 1956), the result of her fieldwork in the 1940s and 1950s.

Jefferson's work is largely a stylistic analysis of the art motifs contained in the carvings; her descriptions of the locations and groupings of the carvings are not very clear, and the monograph is very unsatisfactory from an archaeological point of view.

For this reason, D .R. Simmons saw as one of the objectives of his 1963-4 expedition to the Chathams the problem of "the preservation of the karaka tree carvings, together with a study of their distribution, relationship to settlement sites and possible purposes" (Simmons, n.d.a.). The Historic Places Trust supported this work with a grant. The results of Simmons' work have appeared in several places (Simmons, 1964a, 1964b, 1965) but the detailed distributional work has not been published, except for the Taia grove (Simmons 1965). However, Simmons kindly made available copies of his field diary and some of his records, so that I had a good idea of the nature and extent of his work.

Given this background of detailed study of the dendroglyphs, it appeared likely that most of the significant groups of extant carvings would have been recorded by one of the earlier workers, (though reliable accounts from Chatham Islanders suggest that many carvings had disappeared before systematic recording began.) . Rather than embark on yet another recording exercise, it seemed most useful to use Simmons' study in 1964 as a baseline, against which to assess the rate of destruction of the carvings. As mentioned above, Jefferson's work does not lend itself to this kind of analysis.

Simmons recorded dendroglyphs in three main concentrations - Hapupu, where he numbered nearly 400 trees with carvings; Taia, with about 140 in five main concentrations; and Makeroa with 180 numbered carvings. He numbered a few trees elsewhere, and saw some other groups of carvings, at Tennant's Lake (Te Roto) and elsewhere (Simmons 1964a and pers. comm.). In the time available to me it was not possible to inspect all the trees seen by Simmons. It was decided to concentrate on the three main areas recorded by him.

Hapupu

This group of carvings occurs in the stand of bush at the southern end of the Hapupu airport. The carvings are well known to the Chatham Islanders and New Zealand visitors and are marked on the Lands and Survey Department map of the Island (NZMS 240 Chatham Islands 1st edition). They are on land which is part of the Barker Brothers' Kaingaroa Station* A fence divides the grove, and this served as the baseline for Simmons' work. The fence is used for stock management purposes, and is not intended to prevent stock from grazing in the bush. Consequently there is little regeneration of the bush.

Simmons described his procedure at Hapupu as follows:

In the Hapupu area we laid out a hundred yards baseline, then proceeded to lay out hundred yards squares by chain and compass through the bush. Strict accuracy was not to be hoped for in such conditions, but in fact our first hundred yard square was only inches out in the final leg. Within that square, which at first sight had no carvings, every tree was investigated. The thick moss or lichen was removed carefully with a wire brush and the tree numbered if it had any sign of a possible carving on the bark. In that first square we found 46 trees with possible carvings, and three scatters of shell, not shell heaps, as the shell was only a surface layer about three inches deep. Every three was plotted accurately on a plane table, the possible carving photographed and measured, the girth taken and the state of preservation noted. The first square was a control and training area. The next square was more exciting with very definite carvings of human figures in two main groups facing inwards. Further work on adjacent groups soon made us give up attempting to read any pattern into what we were recording. More and more carvings came to light, and we soon realised we were dealing with a very much more complex story than we had anticipated.

When we had finished recording the carvings in this area, we had laid out seven squares in the 300 yard wide strip of bush and had recorded 300 odd possible carvings, of which 160 are very definite.

(Simmons, ms.a. 3-4)

* All statements about land ownership in this report are based on local information only. They should not necessarily be taken as a description of the legal status of the land referred to.

Simmons records in his diary the problems of relocating trees in the bush. He decided that a number would have to be put on each carved tree. Initially this was done with lipstick, but he soon bought some red paint, and most of the trees at Hapupu and at Taia were numbered in this manner. In the Chathams I heard a number of derogatory remarks about the application of these numbers. I do not think their use could have been avoided, and further they make easy for both scholar and casual visitor the location of the carvings, which are difficult to distinguish at first in all but the clearest examples.

The procedure adopted in 1976 was to relocate Simmons squares, using the fence datum. It was impossible to do this entirely accurately, but knowing which numbered glyphs should or should not be in any given square assisted greatly. Each tree in the squares selected (Simmons' A1 and A) was inspected, its number where present recorded, and the number of trees with glyphs counted. In square A, very few of the trees with dendroglyphs had visible numbers, which tallies with Simmons' account (Simmons ms.b) of using lipstick in this square -- clearly the numbers have not survived. A total of 43 trees with dendroglyphs in this square were relocated, which compared with Simmons' total of 46 suggests that all the glyphs present in 1964 survive to the present. The same situation prevailed in square A1, where the survey was made easier by the fact that Simmons' numbers were done here in red paint, and they have survived much better. In some cases the numbers were covered in lichen, and in this situation appeared as light green numbers against the darker green tree. Of the 48 trees recorded by Simmons in square A1, 47 were relocated.

Exigencies of time and his small work force caused Simmons to abandon the rather slow method of surveying 100 yard squares when he came to record the main concentration of trees at Hapupu in the area directly south of the Hapupu hut. He numbered trees 95-291 in this area, called "Main Harbour Hapupu". Of these 197 trees we were able to relocate only 52. The discrepancy is caused in part by the inadequacy of our survey methods and the shortage of time due to transport problems, but it does also reflect the deterioration

of the bush, which is much more marked on the western and southern side of the Hapupu bush than on the east. The southern and western sides of the Hapupu bush are exposed to the strong winds which often blow from those quarters across Te Whanga Lagoon. The kopi groves respond to the wind by forming a dense wind shorn canopy, which is protected on its margins by smaller species, especially the Chatham Islands matipo, Myrsine chathamica. These exposed margins of the Hapupu grove, and to a lesser extent the eastern side have lost these smaller protecting trees with the result that the wind is able to penetrate under the canopy, with devastating result. That the disappearance of the smaller plants is due to the grazing of stock was demonstrated clearly at the second of the main concentrations of kopi recorded by Simmons, at Taia.

Taia

The eastern margin of Te Whanga Lagoon is a narrow, low lying and swampy area, containing a number of fresh water lakes. Around the shores of these lakes are several stands of kopi bush, a number of which contain dendroglyphs (see Smith and Wernham 1976) but the major concentration appears to be in the bush to the south of Lake Taia (Simmons 1965). A few years ago the Taia bush was fenced by its owner, S. Hough, as a private reserve, according to local information. (Brief discussions with a Lands and Survey Ranger suggest that it is in fact a public reserve). The intention was to preserve the bush as an example of the native flora of the Chathams, but this has had the beneficial side effect of also preserving the dendroglyphs. The undergrowth at Taia is a marked contrast to the Hapupu situation. There are many seedlings of kopi and matipo, 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. A shortage of time brought about by the difficult access to the Taia bush meant that it was not possible to check on Simmons' trees as systematically as had been done at Hapupu. However many numbered dendroglyphs were seen, and it is my belief that most of the dendroglyphs

he recorded still survive, and will continue to do so for some time to come. 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.

Regeneration of the bush does not of course restore those dendroglyphs which have been destroyed. It does however mean that the old kopi with carvings on them which have survived to the present will continue to exist into the future. The lesson to be learned from the Taia situation is that stock proof fences stop the deterioration of the bush and enable it to recover, providing a secure environment for the surviving dendroglyphs.

Makeroa

At Makeroa on the northern shore of the lagoon Simmons recorded 180 dendroglyphs, (Simmons 1964b, 1965:65). He wrote:

Makeroa bush is an isolated patch on the lagoon shore measuring some 200 yards by 70 yards. The trees here are dying very quickly and most of the carvings will be beyond recovery before five years have passed.... the owner has promised to fence the area, but the general opinion is, that while this would help the regeneration of the bush, it will not save the large trees.

(Simmons 1964b)

No trace of the dendroglyphs could be found in the area of dead trees which now remain at Makeroa.

Simmons reports the existence of some 17 other groups of dendroglyphs (Simmons 1964a: 64-7). Most of these are small groups of a few carvings only, in many cases the remains of a once larger stand.

Removal of carvings

The problem of the disappearance of the dendroglyphs has been met in the past by the removal of the sections of the trunk bearing the carvings to museums in New Zealand. Examples are known to exist in the Auckland, Canterbury, National and Otago Museums. Most of the examples in the latter institution were collected during Simmons' expedition. Such removal does mean that the carvings survive, although their conservation does present some problems to the institutions concerned. However, such removal must remain a poor alternative to the preservation of the carvings in situ. The significance of the carvings has a lot to do with their situation, and their beauty can only really be appreciated in the bush. However, the removal of carvings is certainly a desirable alternative to their disappearance, and should be considered in cases where the host tree is dead or dying.

Conclusions

In 1964 three main concentrations of dendroglyphs remained. Today there are only two. One of these is a reserve, and has been fenced to ensure its survival. The other, at Hapupu contains a large number of carvings, many of which are very fine examples. It is accessible by road, and its position adjacent to the Hapupu airstrip makes it accessible to a large number of Chatham Islanders and visiting New Zealanders. Its protection, by reservation, fencing and the erection of a notice is highly desirable. I understand that some discussions between the landowner and the Department of Lands and Survey have taken place. It is to be hoped that these discussions can be brought to a satisfactory and speedy conclusion.

The other surviving carvings do not appear to be sufficiently concentrated to warrant their reservation in their own right. However, in any consideration of the reservation of areas of land for scenic or other purposes, the existence of these groves should be borne in mind, and

their inclusion ensured, if at all possible. In particular the group at Tennant's Lake appear worthy of inclusion in any reserve of the good stand of natural bush which is there.

Finally there is the question of the existing records of the dendroglyphs. Jefferson's work survives only in the form of her monograph. The drawings published therein represent only a small number of the total she made, and there were presumably also sketch maps showing locations. Miss Jefferson died recently, and her papers have not been able to be traced. Neither the Polynesian Society nor Canterbury Museum, both of which institutions were connected with her work, have any material. It is greatly to be hoped that her records do survive somewhere.

Simmons' work was full and detailed, but only brief accounts have been published. As has been acknowledged, Simmons made his notes available for the present survey, but it is to be hoped that these and his extensive photographic records will be available in a published form in the not too distant future.

Petroglyphs

Chatham Island petroglyphs are much less well known than the dendroglyphs. Forbes (1917:346) mentions them briefly as being the same sort of script as occurs on the Easter Island tablets. Skinner (1923:71ff) discusses their distribution, and gives a description of the best known of the caves containing glyphs, Te Ana a Nunuku. In the short visit Skinner was able to make in 1919 (Skinner 1923:4) he could visit only very few petroglyph sites, although he did learn of others from inhabitants of the island. In 1924, he was able to visit the island again, for a longer stay, and he devoted some time to a study of the distribution and form of the rock carvings. In the monograph which stemmed from this visit (Skinner and Baucke 1928) Skinner is concerned principally with the forms represented, though he does reveal that the distribution of the petroglyphs was wider than he previously thought. It is apparent from the monograph (op.cit.:346) and from contemporary correspondence in the files of the Otago Museum that there was considerable interest among some of the inhabitants of the Chathams in petroglyphs, and quite a lot of exploration was carried out. However, very little of the results of this work appeared in print.

Simmons (1964:57 and 60) lists five petroglyph sites seen by him during his 1963-4 site survey. In the time available to him, Simmons was unable to undertake a systematic search for rock carvings, and most of the ones he saw were shown to him by local inhabitants (Simmons pers.comm.). Simmons made a rubber latex mould of part of the carvings at Te Ana a Nunuku (Simmons 1964b:2) and one of his photographs of the same site appeared in a publication dealing with the rock art of the Maori (Trotter and McCulloch 1971:26).

During the site survey undertaken by members of the Otago University Anthropology Department expedition to the Chathams in 1973, 23 sites were recorded containing petroglyphs. Furthermore, some of these sites contained a very large number of individual glyphs. This represented

a considerable increase over the number of petroglyphs previously thought to exist in the Chathams. More urgent, however was the evidence noted of the active deterioration of the carvings. Skinner had commented on the "faint or obliterated" state of some of the petroglyphs (Skinner 1923:74) and mentioned that they were rapidly being destroyed "by weathering and by vandalism" (Skinner and Baucke 1928:345). Simmons noted that "the main danger to these caves is from vandals carving initials. The limestone which is soft does not appear in danger of falling away immediately" (Simmons 1964b:2).

The Anthropology Department team believed however that quite rapid and large scale deterioration of the limestone was taking place. Dr. B.F. Leach wrote to the Director of the New Zealand Historic Places Trust (4th June 1975):

Petroglyphs - there are a number of these on the main island and preservation appears to be related to a black fungus on them. In places where there has been poor regeneration of forest the fungus seems to have gone and the rather friable limestone surface has peeled away. There is one area of caves in a small bay of perhaps 500 metres where 60ft of cliff which for all intents and purposes was covered in carvings is now practically bare of carvings today. In just a few places now you can still see patches of this black lichen or whatever and practically everywhere it occurs on this cliff there are signs of petroglyphs. I think this is a dramatic illustration of the process in operation. However the story is not so gloomy at Moreroa where the famous carved caves are found. Here the lichen is quite healthy and the carvings in very good preservation - it is notable that there is reasonable tree cover also and I would guess that this lichen prefers rather dark and damp conditions.

Thus, as stated to the Trust in my grant application, the work I carried out on petroglyphs in the Chathams had two main emphases. A consideration was made of the present state of preservation of the carvings, and a discussion follows below of methods to assist in their future survival. More important, however, it seemed imperative that a full record be made of as many of the glyphs as possible, so that even should more of the carvings disappear, as seems

inevitable in some cases, at least some information will have been preserved for the future.

The Survey

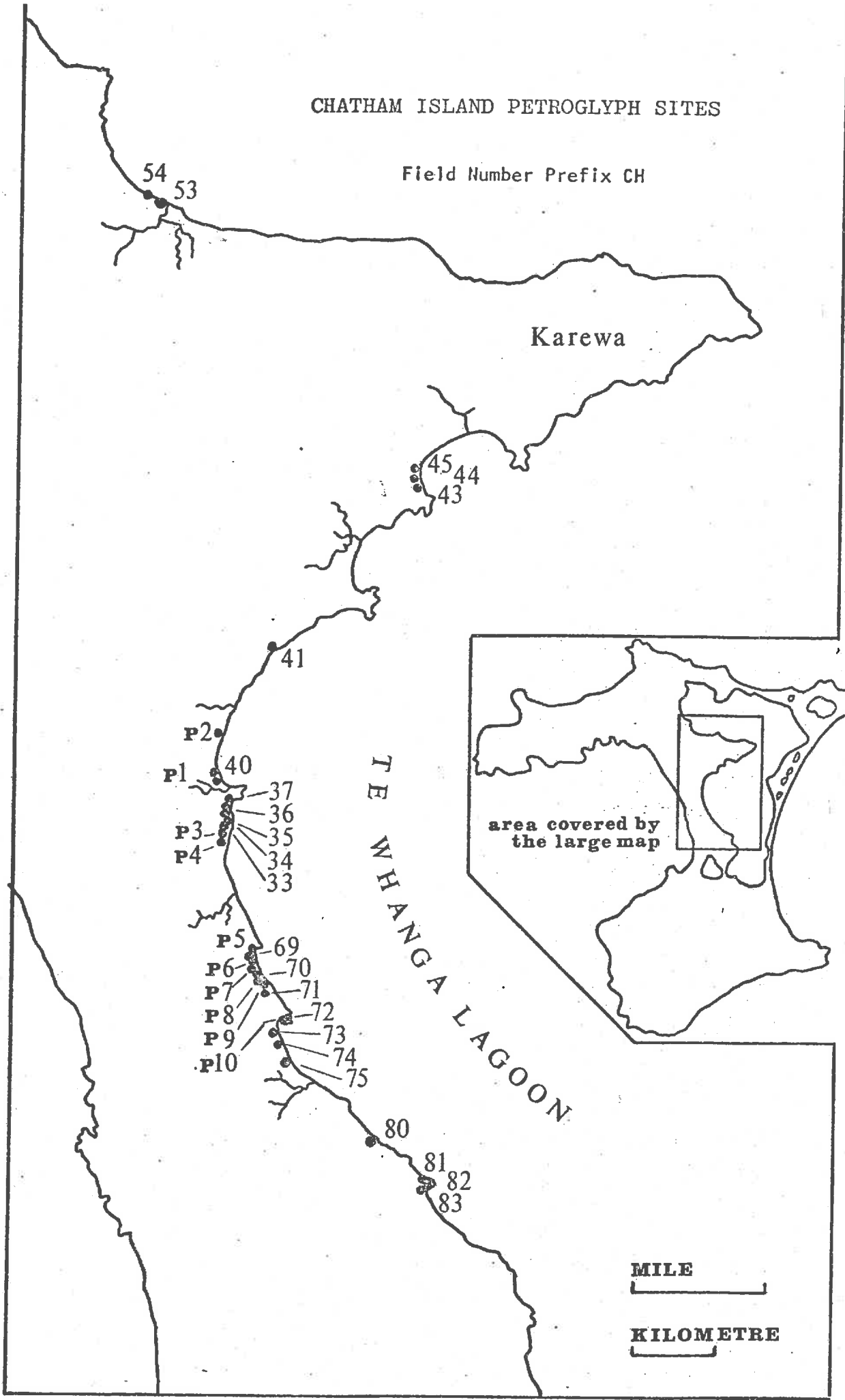
From the work of previous recorders of the rock art, outlined above, it seemed that the petroglyphs were restricted to a fairly closely defined area. All the recorded sites had been on the western shore of Te Whanga Lagoon, from Cattle Point (Skinner's "Te Kiato") in the north, to a beach east of Rapanui in the south. The procedure adopted in the field was to revisit all of the recorded sites, and also to examine all exposed limestone faces and shelters in the vicinity. Ten petroglyph sites not recorded by the Otago University team were located, although one of these had been noted by one of Skinner's colleagues, and one by Simmons.

It became apparent that the petroglyphs were restricted to the soft limestone of the Te One series (Hay, Mutch and Watters 1970:32-5). The geological map published to accompany this bulletin (N.Z. Geological Survey 1969) suggests that the Te One series lies inland of the harder Te Whanga series limestones, but in fact the map is endeavouring to represent in two dimensions what occurs in three - the Te One limestone often occurs overlying the Te Whanga rock (Hay, Mutch and Watters 1970:33). (I am much indebted for discussion on this point to the Geologist with the 1976 Otago University expedition, Hamish Campbell). In some places, the Te One series rock outcrops alone, in others it overlies an exposure of Te Whanga limestone. Nowhere was the Te Whanga stone found to have been carved; indeed the incising technique used for the petroglyphs on the soft Te One stone would have been very difficult if not impossible on the Te Whanga limestone. This is demonstrated by the preference of modern writers of graffiti in the Chathams for the softer stone.

I was unable to visit all the localities where the Te One series outcrops - omissions were the inland sources at Henga, the much disturbed outcrop at the quarry north of

CHATHAM ISLAND PETROGLYPH SITES

Field Number Prefix CH



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Red Bluff, and Red Bluff itself, and Titirangi Point on the Karewa Peninsula. However, all these sites were visited by the expedition's Geologist, Campbell, who saw no trace of petroglyphs.

At each petroglyph site, a detailed photographic record was made of all petroglyphs present. Wherever possible this was done so as to provide information about the spatial distribution of the glyphs, as well as their form. Consideration was given to the use of stereophotographic recording. Difficulties in obtaining equipment, the length of time necessary for such recording, the difficulties of the field situation, the believed shallowness of the carvings, and not least some considerable doubt as to the value of the extra information to be obtained by this method all mitigated against the use of stereophotography. In the event, almost all glyphs were photographed on Ilford FP4 film with a Nikkormat FTN camera and a 55mm Micronikkor lens. Where necessary, a 28mm or 135mm Nikkor lens was substituted. Additionally, many glyphs were photographed in colour on Kodak Ektachrome-X film, using the same equipment. Where possible, available light was used, but in many instances the caves were much too dark for this, a factor which has mitigated against successful recording of many glyphs in the past. A Meccablitz 402 electronic flash unit was used, with Meccatwin heads. Experimentation in Dunedin before leaving for the Chathams suggested that the best results could be obtained using one flash-head on the camera, and the other at an angle of about 35° to the cliff face. Since the Meccablitz calculates the correct exposure for the conditions, the remote unit was set at the same aperture as the camera, while the camera mounted head was set one f-stop wider, thus diminishing the amount of light given out by this unit, and reducing it to a role of fill-in flash. In the field, however, it was found that a recorder working on his own has considerable difficulty manipulating this rather complicated setup. Accordingly, except on a few occasions when an assistant was available, only one flash-head was used, usually remote

from the camera, but set at the same f-stop. Several different angles and exposures were often taken of the same glyph. The results of this procedure were in general good, with satisfactory photographs being obtained for almost all glyphs. The exceptions tended to be those photographed in total darkness, where the results of the flash were difficult to predict.

In addition to the photographic record, several other recording methods were employed at a few sites. A tracing on polythene was made of a group of shallow carvings at CH36. The method used was similar to that employed in New Zealand on Maori rock drawings (Trotter and McCulloch 1971:53-4). On some sites, simple sketches were made of the form and relative position of the glyphs, but sketching was only used as a backup to the photography, because of a lack of expertise in draughting. Finally, at two sites CHP10 and CH36, rubber latex moulds were made of groups of carvings. Simmons had commented on the success of the mould he had made at Te Ana a Nunuku (Simmons 1964b:2), and certainly those I made worked very well, and resulted in no damage to the rock itself. Casts have been made from these moulds, and serve as a very useful adjunct to the graphic record.

The photographic and other records resulting from the recording will be filed as Site Records with the New Zealand Archaeological Association. Black and white negatives and slides are held by the Otago Museum (file 595) and the polythene tracing, latex moulds and field notes are also in that institution. Detailed results of the survey will appear there and will be published elsewhere. A summary of the results is given here.

A total of 33 discrete petroglyph sites were located. Some of these contained only one glyph, while others had scores of carvings, as at Te Ana a Nunuku (Skinner 1923: plate XXXVb). Glyphs at all these sites were photographed, with two exceptions. At CH41 a slip of rock and earth had filled the cave mouth since the Otago site survey. No glyphs remain visible, though it is likely that they still survive under the soil. Simmons' "Bob Rereti's cave"

(Simmons, 1964a:64; site number 126) had been almost completely filled by Simmons (pers.comm.) to prevent further stock damage. This material was not removed, and consequently only the peripheral glyphs were seen. Another petroglyph site known of but not recorded is "Te Rerenga Wairua", which was reported to be "curiously carved", but no details about it have been recorded, beyond Skinner's note (Skinner and Baucke, 1928:345). No attempt was made to relocate the cave in 1976. The existence of a petroglyph on one of the islands of the Sisters group has been reported by a member of a Wildlife Service team who visited the group in 1975. A subsequent visit to the Big Sister by D.G. Sutton in 1976 has confirmed the existence of at least three clear "bird/seal" glyphs, as well as a number of indeterminate marks.

The glyphs show a wider range of forms than had been anticipated. The "bird/seal" motif referred to by earlier writers certainly predominates (Simmons 1964a:64; 1964b:1. See also Skinner 1923:plate XXXVb and Skinner and Baucke 1928:fig. a). Other birds are represented, however; several very clear penguins, a "shag" and the "moa" figured by Skinner and Baucke (1928:346). Both geometric and curvilinear designs were present, and two or possibly three representations of the human figure. Crescentic designs were seen in a number of places, and in one cave one of these appeared to represent a boat or canoe.

All of the above mentioned designs are presumed to be the work of the Moriori, and are presumably prehistoric. Additionally there are a number of historic period glyphs - two sailing ships and several words or names in Maori, in the script used by missionary teachers of the nineteenth century, one of which also had the date 1870.

In addition there are many more modern "petroglyphs", usually in the form of names or initials, though mottoes ("Death Before Dishonour") and designs (e.g. skull and crossbones) were also present. Judging by the dates accompanying these, the inscribing of initials appears to occur in cycles -

the 1940s, the early 1960s and the 1970s appearing to predominate. In many places the modern carvers had avoided the older Moriori or Maori glyphs, choosing adjacent areas, though there were also many instances where modern initials had defaced or obliterated the original drawings (c.p. Skinner and Baucke 1928:345; Simmons 1964b:2).

The age of the petroglyphs described above has been ascribed on stylistic grounds, but is no more than guesswork. Certainly for the prehistoric carvings there can be no clear idea of their age from the work done to the present. For this reason, two caves are of considerable interest, and should be preserved intact until they can be adequately excavated. Both Simmons' "Bob Rereti's cave" (CHP3) and the cave (CH36) just south of Te Ana a Nunuku are almost filled with soil and debris. Some of this is recent fill, but some is old, and appears to contain some cultural material (Simmons: pers. comm.). The importance of this is that in both caves there are glyphs which are covered by this fill, and which therefore predate it. The careful excavation of these caves could therefore yield a terminus ante quem at least for the carvings which they contain.

It can be fairly claimed that there is now a reasonably complete record of the petroglyphs of the Moriori. However, the question of the preservation of the carvings in situ is not so easily solved. It seems unlikely that the black lichen referred to by Leach (supra) is acting as a preservative, indeed one might expect the reverse to be true. One omission of my work in the Chathams was the failure to collect samples for identification of the various species of lichens (not all black) which grow on the rock face. Some effort should be made to collect some samples and have them identified. However, the phenomenon seen by Leach, that the lichen occurred where the carvings were preserved, and that drawings had disappeared where the lichen was gone seems to me to be capable of a different explanation. In a letter to me dated

10 December, 1975, Dr. W.A. Watters of the New Zealand Geological Survey, who was one of the authors of the Bulletin on Chathams Geology (Hay, Mutch and Watters 1970) suggests that the increased weathering of the limestone in recent years may be due to an increase in ground water acidity, due to the increased use of superphosphate on pastoral land nearby. It is likely that such a change would also affect the growth of lichen. Another factor which may be involved here is the removal of the bush which grew at the base of the limestone bluffs along the shore of the lagoon in many places, but which is now rapidly disappearing for the same reasons outlined above in the discussion of dendroglyphs. The effect of this is that the limestone faces containing the petroglyphs are now much more exposed to the weather than was formerly the case. Certainly, some of the best preserved carvings are in places where the bush survives to some extent. However, it may be that the survival of bush and petroglyphs together is the result of some other phenomenon, and not of a causal relationship.

Apart from this natural weathering, the other major factor in the deterioration of the carvings is the effect of modern carvers of initials and other graffiti. It appears that most of this carving of initials and so forth is not intended to be destructive of the earlier art forms. It is notable that at the few Moriori petroglyph sites which are widely recognised as such by the Islanders there are almost no traces of graffiti. Whilst most of the petroglyph sites visited appeared to be known to the local inhabitants, only the more spectacular of the carvings were recognised as being of interest or importance. I believe that the incidence of graffiti which are destructive to the Moriori art would decrease were some publicity to be given on the Island to the fact that all the petroglyph sites are of interest, importance and artistic merit.

Conclusions

The problem of the weathering of the limestone is difficult, and at present I can recommend no solution. The problem is not of course confined to the Chathams, and it may well be that the Trust should commission a group of geologists and others to examine the problem as it applies to all limestone outcrops in New Zealand and the Chathams which bear prehistoric art. The Geological Survey are currently concerned with the deterioration of the limestone at Waitomo caves, and it seems likely that their research there will have some bearing on limestone elsewhere.

The Ministry of Works in Dunedin have been consolidating limestone facings on buildings with a poly-vinyl acetate solution and this may be part of the answer, though it may simply cause the cliff face to come off in bigger pieces.

Additionally, I have been in communication with Mr. K. Hempel of the Victoria and Albert Museum in London, who is a specialist in the problems of the conservation of stone, and was greatly involved in the treatment of marble and limestone objects after the Florence floods. Whilst his concern is principally with limestone occurring in artificial localities, it seems likely that some of the techniques involved will be applicable to the Chathams and New Zealand situation. One of the products he uses in consolidating limestone is made in New Zealand by a Nelson company, suggesting that both the materials and the necessary expertise may be available locally to solve the problem.

Until the processes involved in the deterioration of the limestone are better understood, it does not appear necessary or even desirable to fence the surviving areas of bush around petroglyph sites. Additionally the sort of protective fencing which has been used in Canterbury and Otago to protect rock art sites does not seem to be necessary in the Chathams, since both the numbers and the nature of visitors to these sites is rather different. I do believe however that greater recognition by the Islanders of the value and significance of the carvings would significantly

reduce the damage by graffiti. Noticeboards should be erected at the main concentration of carvings at Moreroa (CH36 and 37 in particular) and at another group on the property of Manu Tuuta (CH69) which appears to be a unique example of a large composition made up of smaller units of individual glyphs. Formal reservation of these sites would appear unnecessary, at least under their present owners, though it might be considered necessary in future. The position of other petroglyphs should be borne in mind when scenic or other reserves are being created.

The noticeboards should describe the petroglyphs and what is known of their origins, and mention the existence of other rock art sites along the lagoon shore. Additionally, some information on the distribution of these sites could be included in a display in the Chatham Islands Museum.

Summary

The action recommended to the Trust above can be summarised thus:

- (1) The erection of a stock proof fence around the dendroglyph grove at Hapupu. A fence 2km in length would include all the carvings, but a larger area might be included to ensure the survival of this stand of bush.
- (2) The erection of noticeboards at a minimum of two petroglyph sites, at Moreroa and north of Ohuru.
- (3) The sponsorship of an investigation by geologists, chemists and others into the causes of the deterioration of limestones in New Zealand and the Chathams, and an examination and trial of methods of preservation of rock art.

Appendix

Fencing in the Chatham Islands.

This report recommends the erection of some fencing in the Chathams, and other archaeological sites may need to be fenced in future. The issue of the fencing of reserves is a contentious one on the Island, particularly when large quantities of fencing material are imported from New Zealand, occupying valuable space in the few ships which call, for a non-economic end. Consideration should be given to the utilisation of at least some local materials in fencing, perhaps using imported tanned posts with locally cut rails of matipo. Thought also needs to be given to the question of the maintenance of such fences. It may be that this responsibility should become that of the local authority on the Island, perhaps acting as a Domain Board over reserved areas.

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