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AGRICULTURAL GARDENS ON MOTURUA ISLAND IN THE BAY OF ISLANDS

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In November 1968 a party of Auckland students excavated two sites interpreted as gardens. The sites are filed under the N.Z.A.A. recording system as N12/6, a slope garden, and N12/8, the flat garden. The slope garden was discovered by L. M. Groube, then of Otago University, during a major excavation in the 1964-5 season at Paeroa village (Groube 1966: 11). At that time the interpretation of the latest activities at Paeroa village as agricultural, was tested by comparing their soils with those of a garden on the south slope of a small bay nearby. As expected, the man-made soils of the slope garden proved to be identical with the final soil covering parts of Paeroa village. From its position in the stratigraphic sequence, the Paeroa pa soil was associated with a period of post 1840 agricultural activities (Groube 1966: 11).

SITE N12/6. THE SLOPE GARDEN

During the 1966 investigations it was discovered that surface channels, interpreted as drains, were cut into an earlier man-made soil of different texture and content. Partway up the slope the two soils were separated by a clay horizon (slip) which covered the earlier agricultural soil and on top of which occurred a developed paleosoil, indicating that a substantial break in time existed between the two agricultural soils. A radiocarbon date derived from charcoal formed in the early soil gave a date of 1150 B.P. ± 90 (Gak 840). Groube also interpreted the depressions or holes found at the bottom of this agricultural soil as probably for taro, presumably created when it was lifted or planted.

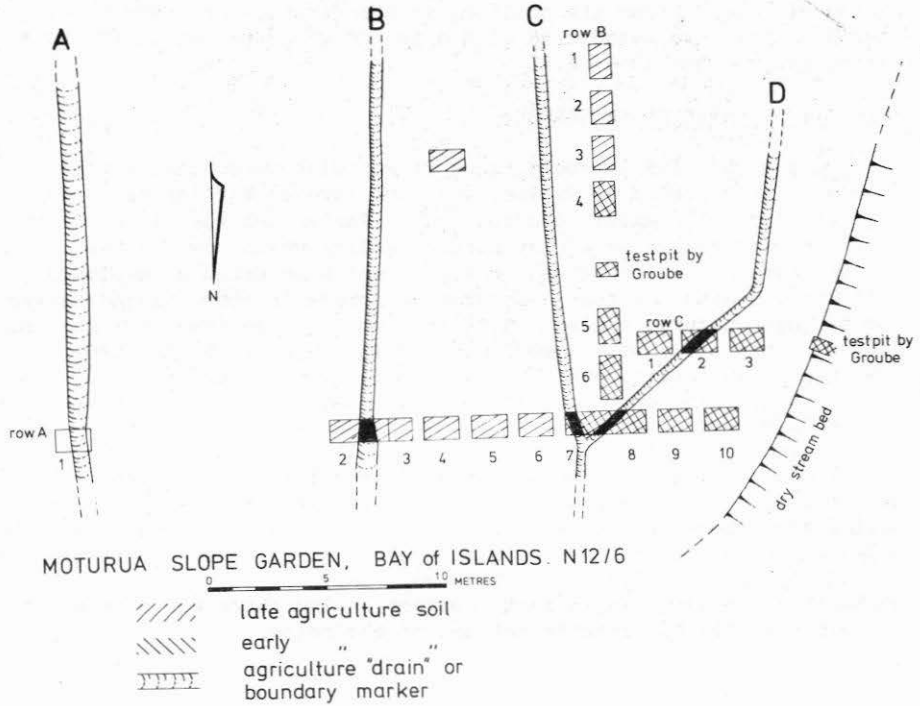
The aims of further work by myself were firstly to investigate the extent of the slope garden and collect reliable carbon samples for dating as a check on the initial date, and secondly to investigate the holes at the bottom of the early man-made soil to ascertain if they were created by taro cultivation. This work was done as there was some doubt that the date was, in fact, correct; also there was some question as to other possible interpretations of the holes.

A third aim was to investigate the flat behind the beach, because, although no surface evidence was apparent, it was anticipated that occupation or cultivation activities had also occurred there in the past.

As mentioned before, the bay is to the south of Paeroa pa and consists of a built-up flat area behind the beach. It is sheltered on three sides by bush-clad hill slopes. The south slope has surface evidence of channels on a slope with an approximate angle of 20°.

THE EXCAVATIONS

A line of squares was laid out at right angles up the slope to another across the surface channels. From these it was hoped to define the approximate extent of both the early and late gardens (Fig. 1).



FEATURES

Except for irregular holes, no features were discovered in the early man-made soil; the later garden soil had only the still evident surface channels cut into it. There were four of these surface channels all running straight down the slope, while the channel close to the dry stream (marked D), ran at the bottom across the garden joining up with the middle channel (c) in sq. A 6. The extent of the early garden, estimated on the basis of the excavation results would have been approximately 80-100 sq. metres, while the later garden measured approximately 500 sq. metres.

STRATIGRAPHY (Fig. 2)

The stratigraphy encountered in the excavation was as follows:

Layer 1. Topsoil.

Layer 2. Man-made agricultural soil, beach pebbles, dark grey/brown sand, charcoal, shell.

Layer 3a. Mixture of layers 2 and 3b.

Layer 3b. Clay slip.

Layer 4. Mixture of clay and man-made soil (layer 5).

Layer 5. Man-made agricultural soil consisting of brownish/grey soil, mixed with beach pebbles, fragmented shell and charcoal.

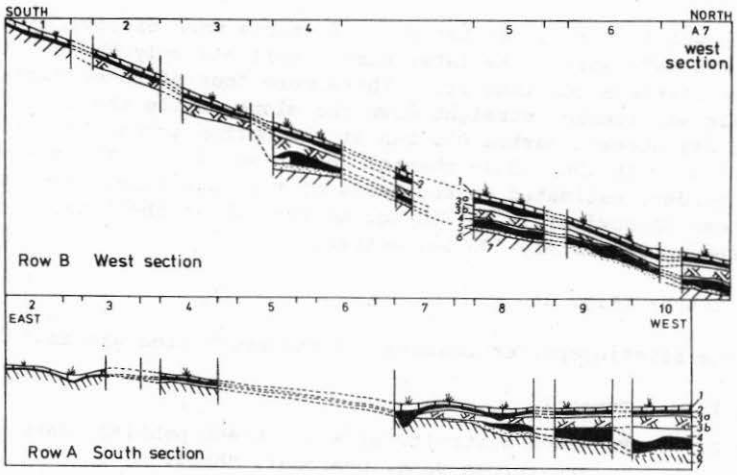
Layer 6. Greyish/brown gleyed soil mixed with charcoal, some sand.

Layer 7. Natural yellow greywacke clay.

INTERPRETATION OF THE STRATIGRAPHY

Layer 7 is the natural greywacke clay deposits, while Layer 6 is the greyish/brown gleyed soil formed when the water table is high (particularly in the wintertime) and the horizon on top of the clay deposits becomes saturated with water periodically; this leads in turn to intense chemical reduction. It is characterised by the presence of ferrous iron grey colours, which change to brown on exposure to air (Soil Survey Method 19: 35). The uneven surface holes and depressions found in this layer were previously interpreted as holes created when lifting or planting taro. In the light of the excavations, my interpretation is that these holes were either created by the clearing of the ground after the initial burn-off, or by the tilling action of the ko during cultivation activities of the man-made garden soil above (Layer 5). In some places these holes and depressions were very distinct, while in other places they were not in evidence. I also observed a tendency by the excavators to "create" holes, by digging out fissures. In short, if this had been a taro garden, as was earlier claimed, these holes would have exhibited more consistency, which in fact they did not.

Figure 2



MOTURUA SLOPE GARDEN, BAY of ISLANDS N12/6 MAIN SECTIONS.

0 1 2 3 4 5
METRES

1
2 late agricultural soil
3a mixture of clay and agric. soil
3b greywacke clay (slip)
4 mixture of clay and early agricultural soil
5 early agricultural soil
6 grey/brown gleyed soil and charcoal
7 natural

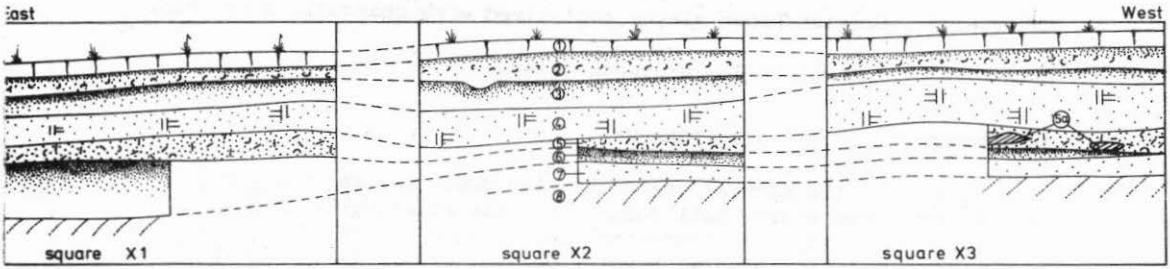


Figure 3

MOTURUA GARDEN N12/8 BAY of ISLANDS

0 1
metre

topsoil
charcoal stained soil mixed with sand shell and beach pebbles
same as 2 but more compact with yellow clay lumps
yellow sand mixed with some shell, clay and charcoal
yellow sand and shell
dark brown/grey sand
yellow brown sand
dark grey sand

Layer 5 is the first agricultural soil formed by man on this slope. It was formed from the then topsoil with the addition of beach pebbles, sand, fragmented shell, and charcoal. The fragmented shell consisted mainly of pipi, cockle, and the occasional oyster shell. The sand, pebbles and shell were no doubt collected on the beach below, while the charcoal could have been derived from the burn-off which took place when clearing the slope. The charcoal was of reasonably big lumps and very fine specks and pieces. The carbon 14 sample which was collected for dating was selected only from the very small fragments of twigs and specks of charcoal to give as accurate a date as possible.

Layer 4 was formed by the interaction of the clay erosion slipping down the slope and mixing with the surface of Layer 5, the early man-made soil, and the bottom of the clay slip, Layer 3b. The 3b layer is the clay slip which eroded from above the early man-made soil and covered it, presumably when the garden was abandoned. A soil horizon was then formed on top of the clay. This was later disturbed by clearing and, presumably, the burning off and formation of the later garden soil, which contributed Layer 3a.

Layer 2 is the latest agricultural activity to have taken place on the slope. It consists of sand, beach pebbles, shell, charcoal and brown soil. The shell was not as fragmented as in the earlier man-made soil. Speciments were pipi, cockle, and some oyster, all available down from the beach. A modern soil has formed on the prehistoric one after the garden was abandoned. This is Layer 1.

ARTEFACTS

On Site N12/6, the slope garden, only two artefacts were found. One, recovered by Groube in his test excavation, was an obsidian flake from the top of his Layer 5, and the other from my excavation was a large obsidian flake measuring ± 10 cm in length, also from Layer 5. It was retouched on one edge. Unfortunately, this artefact was stolen during its transportation to the laboratory. Both flakes were green in colouring and thus presumably came from one of the Mayor Island sources in the Bay of Plenty. No other material was discovered.

SITE N12/8. THE FLAT AREA BEHIND THE BEACH

STRATIGRAPHY (Fig. 3)

The stratigraphic evidence discovered in the area is as follows:

Layer 1. Topsoil.

Layer 2. Black charcoal-stained soil mixed with sand and beach pebbles and shell.

Layer 3. Same as Layer 2 but more compact and mixed with yellow clay lumps.

Layer 4. Yellow sand mixed with charcoal, some shell and clay.

Layer 5. Yellow sand and shell.

Layer 6. Dark brown/grey sand.

Layer 7. Brown/yellowish sand.

Layer 8. Dark grey sand with patches of light brown sand.

INTERPRETATION OF THE STRATIGRAPHY

Layer 1 - turf.

Layers 2 and 3 represent man-made agricultural layers covering most of the flat land in the bay. They comprise rich black, charcoal-stained soil mixed with sand and beach pebbles, and shell (Layer 2), while Layer 3 is the same as 2 but more compacted, with the addition of yellow clay lumps. This layer was probably the first agricultural activity in the small bay. The clay lumps are more than likely derived from the erosion of the greywacke clay slopes around the flat. An attempt was made by means of a series of test pits to link stratigraphically the excavations on the slope with those on the flat. However, both agricultural areas stopped within a few tests, leaving a gap of approximately 150 metres between the two gardens.

Agricultural Layers 2 and 3 were formed on top of an old sandy level, which constitute Layers 5, 6, 7 and 8. These would appear to be various stages of build-up by sea and wind action which had formed the flat area.

FEATURES

On the flat only one feature was discovered - a possible drain, cut into Layer 5, which ran in a north-west direction and was 54 cm deep. It could not be established if it was associated with any structure or that it had some other function than a drain, which would not seem to be required in sandy soil. From stratigraphic evidence it was apparent that it was constructed before the garden soil was formed, i.e., Layer 3, overlay those layers which had filled in the drain. From the limited evidence, then, it appears that it belongs to activities which had taken place before the garden soil was formed. What the activities were was not established by these excavations.

ARTEFACTS

In the garden flat, more artefacts were discovered than in the excavation on the slope. In sq X 2, two flakes of obsidian were found, together with a chert flake, a dog canine, and some indistinguishable bone fragments. A broken adze made of basalt, quadrangular in shape, partly polished, was found in sq X 4 on the bottom of Layer 3. It was lying over the drain cut into Layer 4 and could belong to the 1A variety of Duff's adze classification, although this is difficult to ascertain. The stone material from which the adze was made is basalt, which source has been traced to Tahanga Hill at Opito Bay, Coromandel (Best 1975: 25).

The obsidian flakes discovered in this site, 12/8, are of the green translucent variety and, like the flakes discovered from Site 12/6, are probably from a source on Mayor Island.

OBSIDIAN

During Groube's test excavations on Site 12/6, one obsidian flake from Layer 5 was discovered from which the hydration rim, when thin-sectioned, gave a reading of an average of 1.65 microns. This compares favourably with hydration rim readings on two flakes from Layer 3 in the garden flat, which yield readings from 1.65 to 1.93 microns. This strongly suggests that the two adjacent soils are contemporary and fairly old, of an age comparable to several well-known Archaic sites elsewhere (Green 1964: 135).

"DRAINS"

The term "drains" which has been used throughout this report has recently been queried by A. Sullivan on the grounds that it begs the question of function: she suggests that many may be boundary or plot markers, and only incidentally for drainage (Sullivan pers. comm.). In various places where I have observed field systems with "drains", it would appear they did not serve to drain the gardens in any obvious way. This, for example, is the case on the Moturua slope garden, N12/6. Thus, if the four channels on the slope were designed for drainage, one would have expected "cross drains" above the garden, to collect the surface water running down the slope leading it away from the garden. As the channels run straight down the slope, they don't serve the purpose of "draining" very well; therefore, I agree with Sullivan that in this garden the features are better regarded as being primarily boundary markers (see Fig. 1). However, I would not consider that all "drain" systems were for plot marking. For example, on Moturua Island itself there are a few slope field systems, N12/7 and N12/9, which in my opinion were definitely designed to divert water away from the various plots. They had diagonal cross drains designed to collect the surface water running down the slopes and divert it into drains running straight down the slope.

In my view, each field system must be looked at and interpreted in relation to the pattern it forms and its physical location. In one case, channels might be designed as drains, in another, as at N12/6, they simply function as a boundary marker. Some may even have a multiple function, draining, marking and in some cases irrigation, as was pointed out by D. Yen (pers. comm. to M. Nicholls 1965: 148). When we are speaking about a boundary marker it is not the channel which was the main feature, but the ridge formed from it, which in most cases would not be more than 10-20 cm high. This ridge over a long period of time would erode due to weather action, grazing by stock and other modern agricultural activities. This would lead to the impression that the channel was the sole feature.

DATING

Confirmation of the early date obtained by Groube for the early man-made soil, one of the objectives for this excavation, has proved to have created some problems. The dates obtained for my slope garden are as follows:

Layer 5: ANU 543 - 510 ± 85 years before 1950 (old half life).
Layer 6: ANU 542 - 720 ± 100 years before 1950 (old half life).

They may be compared with the dates obtained by Groube of:

Layer 5: NZ 647A - 530 ± 90 years before 1950 (old half life).
Layer 6: GaK 820 - 1150 ± 90 years before 1950 (old half life).

The two dates of 510 ± 85 and 530 ± 90 B.P. for Layer 5 pose no problem and confirm the man-made soil as early. However, the discrepancy in dates for the Layer 6 appears likely to be real from a statistical evaluation of the two results. It suggests for GaK 820 either a C.14 laboratory error in Japan, or, as is far more likely, that wood from the charcoal came from old trees already having an age of 200 to 400 years - perhaps old kauri.

As was stated earlier, the charcoal selected for the C14 samples taken in my excavation came from fine fragments and twigs. The dates for Layers 6 and 5 confirm the distinction between the two early agricultural soil layers. They also support claims for agriculture in the north of New Zealand, for when compared with dates from Wiri, Auckland (Sullivan 1975), and the Wairarapa (Leach and Leach 1971: 201), they indicate that agriculture was well established in the 13th Century throughout the North Island.

Although no dates were obtained for the flat area, the artefacts imply that this area was utilised for agriculture in the same period as the garden on the slope. This is supported by the similarity in the hydration rims on the obsidian. In fact, given the greater difficulty of gardening the slope than the flat, it would seem strange not also utilising the more easily worked flat if one had established a garden on the rather steepish slope.

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AGE AND FUNCTION OF MADE SOILS
A COMMENT ON THE STATE OF KNOWLEDGE

Garry Law

Helen Leach, in a paper delivered to the Maori Soils seminar at Hamilton in 1974, called for New Zealand archaeologists to reject their ethnographic crutch in relation to studies of prehistoric horticultural features. She pointed to the inadequacy of the ethnographic record of made soils, and of particular relevance to the preceding papers, pointed to the lateness of the record of the technique.