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A BEGINNER'S GUIDE TO UMU TI

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Prehistorically, Cordyline (mainly terminalis) provided a source of food and fibre throughout the Pacific. These uses continued with the settling of Polynesia (Brown, 1931; Buck, 1930:236; Henry, 1893; Seeman, 1865-73; Setchell, 1978) and reached an optimum in New Zealand where new species provided an even greater choice of applications (Best, 1976; Cheeseman, 1906; Walsh, 1901).

The Maori collective name for all of the species is ti, as in most of Polynesia. Today Cordyline is commonly called 'cabbage tree' in New Zealand.

The major use of ti in Polynesia and especially New Zealand was for a source of carbohydrates (Fankhauser and Brasch, 1985). The edible root (underground stem) served as a food source in most of Polynesia, but New Zealand's indigenous ti plants also have an edible stem and top (undeveloped leaves).

This article looks at the remaining archaeological evidence in New Zealand of the use of ti as a food. Scattered throughout southern New Zealand are large, mostly raised-rim pits which were used to cook Cordyline roots and stems. They are the remains of Polynesian steam ovens and are referred to as umu ti (Cover and Fig. 1). Many of these sites have been recorded in the South Island, especially in South Canterbury, Otago (Knight, 1966), and Southland. Very few if any umu ti have been recorded in the North Island. This is in spite of their most certain existence as revealed in the literature (Best, 1931, 1976; Hammond, 1924:62; Wade, 1842:58; Walsh, 1901).

It is evident that a guide to finding and identifying these sites is needed. I will present some of my results from site surveys and excavations of umu ti in South Canterbury which may better acquaint archaeologists and others in the North Island with the identification of these sites and what to expect below the soil surface. Site surveys were carried out from 1981-1984 and excavations were done in 1982. The excavation and interpretation of an earth-oven site near Waimate will be presented. The discussion of this site will include some results from other excavations done during the same excavation programme. I also give recommendations on how to identify and excavate an umu ti site based on results of this work.



FIGURE 1. Author standing on rim of umu ti at S128/10.
Oven located at 11 on Fig. 2 and 10 on Fig. 3.

Near Strm.	Hill Top	Slope	Flat	Valley	Gully	Terrace	Raised Point	Stream Bend	Stream Bank
95.1 (4.9)	8.5	24.3	70.7	39.0	11.0	32.9	8.5	37.8	50.0

Note: Number in parentheses for location near stream indicates percent unknown because of changing topography.

TABLE 1. Locations of large ovens in South Canterbury (% occurrence).

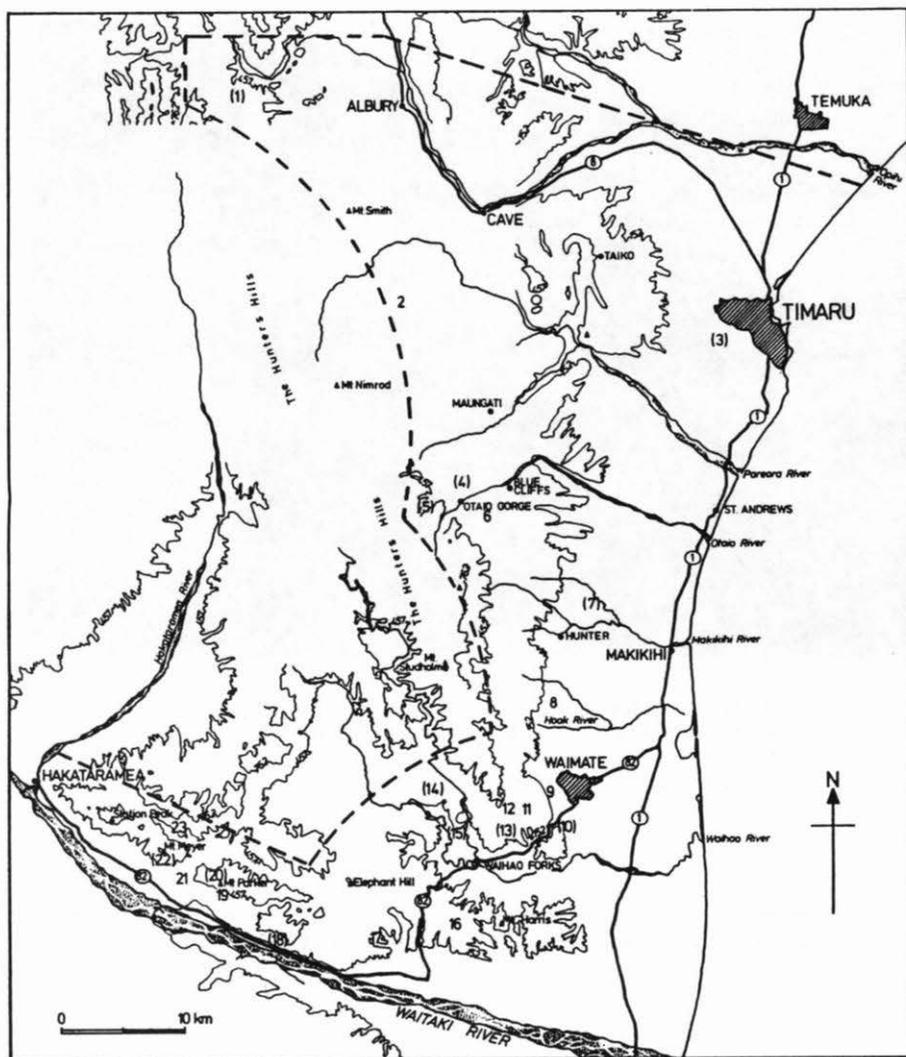


FIGURE 2. Research area in South Canterbury bordered by dashed line and Waitaki River to south. Open sites indicated by numbers; parentheses show excavated sites. Contours in metres.

Site survey results

My research are in South Canterbury is shown in Figure 2. This figure also gives the locations of earth-oven sites and excavated umu ti. A glance at the map indicates that umu ti are found in all types of terrain - from plains to valleys to mountain tops. None are found next to known prehistoric settlements.

The types of terrain in which these ovens (82 in this study) are found is given in Table 1. Any one oven can be classified into one or more locations. For example, one oven I recorded is located in a gully on a raised point of land in a bend of a stream on the bank. Nearly all ovens are located near streams. One of the reasons for this may be that water was needed to produce steam in an umu ti. Of course, it would have been convenient to have a water source nearby during the hard work of oven construction. Particularly common places for ovens to be located are on stream banks on stream bends in valleys. Many ovens on the plains have probably been destroyed by cultivation. Ovens would also have been destroyed in the North Island, but it is likely that many still survive based on South Island results.

To get a better idea of oven distribution in a small area, a map of a single farm, Limestone Hills, near Waimate is presented in Fig.3. I recorded 27 ovens on this property and more are still being discovered by the landowner. About half the ovens are located on fairly flat land along streams (1-6, 10). This property is very hilly and ovens were unexpectedly found in difficult to reach areas (7, 8). Measurements of some of these ovens are given in Table 2. The diameters give a rough idea of the relative sizes of ovens, but the true diameters can only be determined by excavating. Recorded umu ti in South Canterbury vary in diameter from 2 to 6.8 metres to the highest parts of the rims. The depths (above turf) have little to do with the actual sizes of ovens because they are the result of the amount of filling from ovenstones and erosion. Most of the ovens in South Canterbury are circular with 76% of them having raised rims. Note that two ovens listed in Table 2 are oblong. Construction of such ovens has been presented by Hay (1915:15) and Stack (1893:26-27) and Anon. (n.d.).

Pits associated with ovens are common at Limestone Hills. They contain no stones as determined by probing. Pits associated with major excavations were found to be empty and most likely served as borrow pits to cover ovens while cooking (see discussion below). Ovens and associated pits for one site at Limestone Hills are shown in Figure 4. Ovens are often found

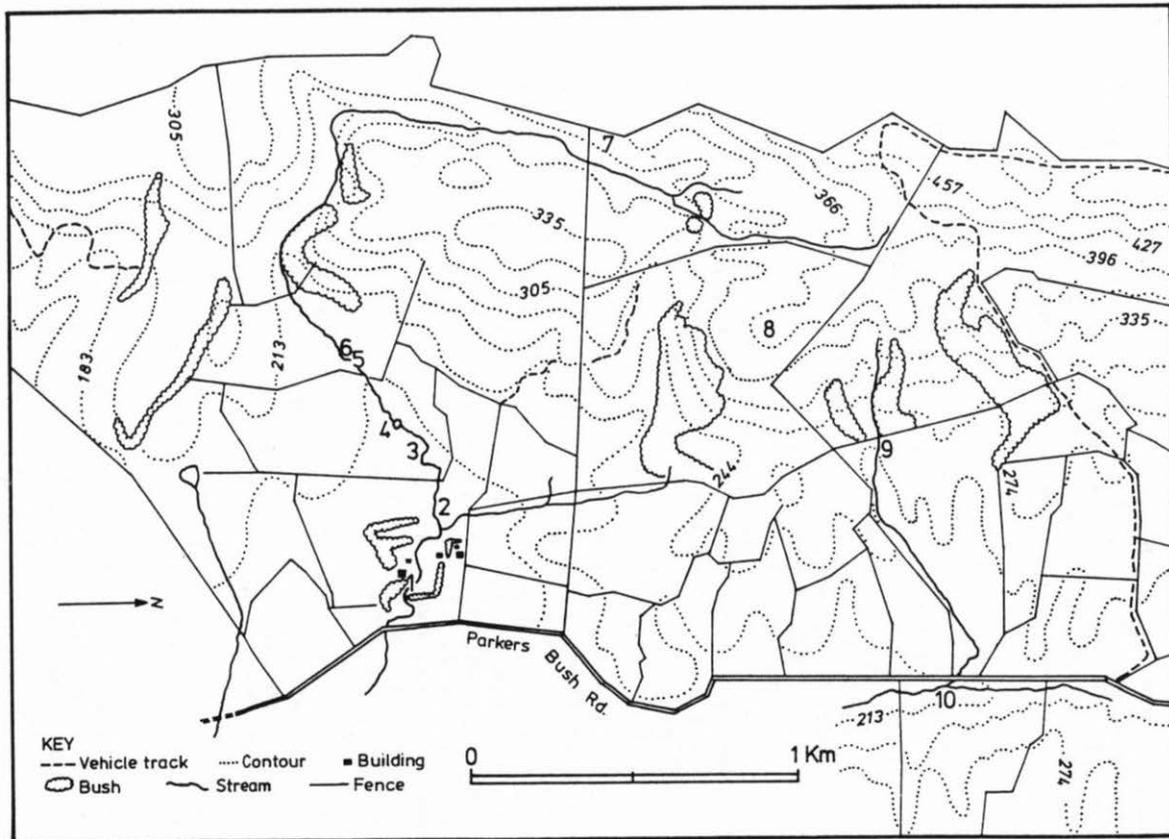


FIGURE 3. 'Limestone Hills'; numbers give oven sites, some of which are described in Table 2. Contours in metres.

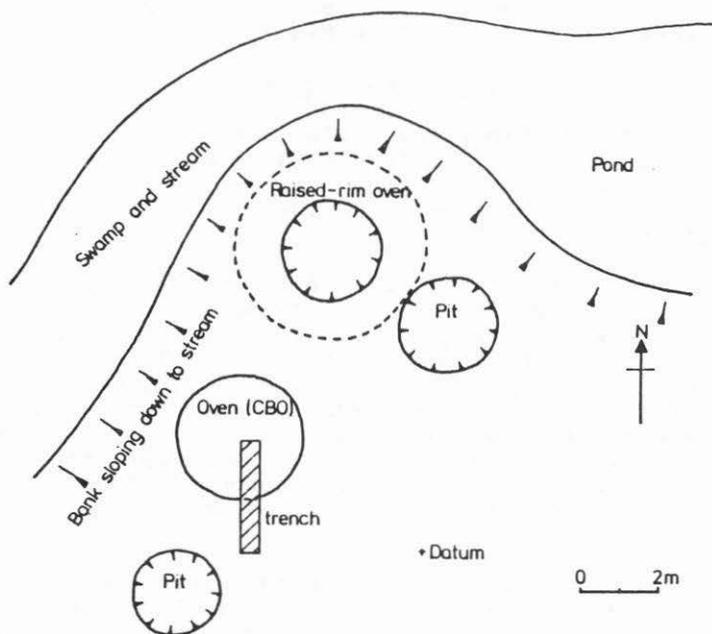


FIGURE 4. Plan of S127/161; number 4 in Figure 3 and Table 2.



FIGURE 5. S127/160 before excavation.

in groups of two or three. The most ovens I have seen in one group is seven located at '6' in Fig.2.

Excavation of S127/160, Limestone Hills

Site S127/160, Limestone Hills (Site 1, Fig.3), is located on a bank near a stream. Before excavation, the surface topography was marked by three large pits, one with a raised rim and a ditch running parallel with the line of pits at a distance of about three metres (Fig.5 and Fig.6).

The raised-rim pit was full of ovenstones, charcoal and soil. Up to 15 cm of charcoal and pieces of unburned wood were found below the ovenstones. Fired clay fragments were found in the ovenstone layer and the sides of the oven contained fired clay. Throw-out (fired stones and clay, melted greywacke, charcoal) from a previous oven was concentrated south of the raised-rim oven (Figs 6 and 7), but was evident in all squares around the perimeter and was found up to a depth of 60 cm. A throw-out layer, or more properly throw-off layer from uncovering the raised-rim oven, was found up to 2 m from the outside of the oven.

Pit 1 was also an oven containing a large amount of stones, fired clay, and charcoal. Throw-off from the raised-rim oven was overlying it. Pit 3 contained no concentration of stone or charcoal. A shallow oven 0.8 m in diameter was found within the throw-out debris and under the throw-off layer at a distance of 1 m from the raised-rim oven (Figs 6 and 7).

No artefacts or bones were found except for sheep bones. No post-holes or signs of camping were found in the area excavated.

Interpretation and discussion

From the amount of fired stone and charcoal debris surrounding it it is evident that the raised-rim oven was used more than once. Other evidence for re-use is melted stone and fired clay fragments in the area around the oven. (About half of the 30 umu ti excavated showed evidence of re-use.)

The average ovenstone sizes and total masses for the site are given in Table 3. This indicates that the throw-out is consistent with another oven of the same size as the small oven (Pit 1). Therefore, the larger raised-rim oven was built in the same place as a small oven and the stones from this oven were rejected in preference for larger stones. This may indicate a preference for stones of a certain size. Considerable labour was involved in carrying the stones from the nearest greywacke outcrop 0.8 km away.

Map No.	NZAA Site Number S127/	Diameter to Top of Rim (m)	Depth (cm)	Pit
1	160 (LH-1)	n.r.	20	N
1	160 (LH-2)	4.3	40	Y
2	163	3.0	30	N
3	159	2.4 x 4.3	35	N
4	161 (CBO)	3.9	53	Y
4	161	3.4	55	Y
5	165	2.4	20	N
6	164	2.4 x 3.5	30	Y
7	168	3.7	35	Y
8	169	n.r.	40	N
8	169	3.6	40	N
9	170	3.3	35	N
9	170	2.8	20	N
10	128/10	5.0	50	Y

Notes:

1. Depths were determined from the highest point of rims or, in the case of no rims, from the surrounding area; n.r. = no rim.

2. Y = yes and N = no to indicate if a pit was found next to a particular oven.

TABLE 2. Measurements of some ovens on 'Limestone Hills' shown in Figure 3.

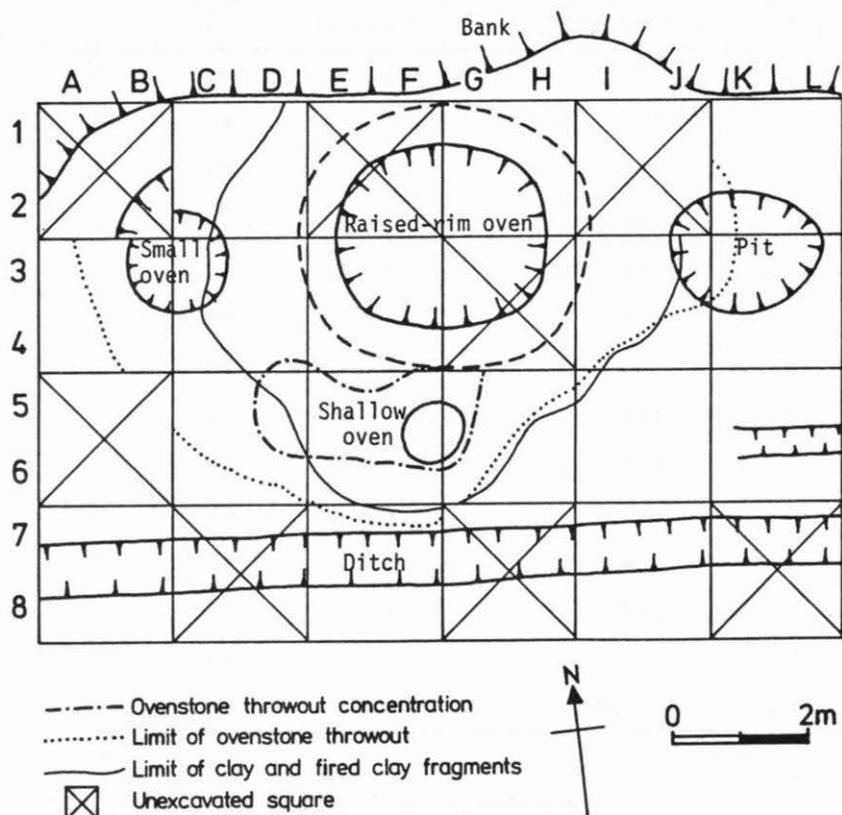


FIGURE 6. S127/160 site plan. Pits numbered 1-3 from left.

Oven	Total Mass (kg)	Mass/stone (g)
Raised-rim oven (LH-2)	1980	105 ± 26
Small oven (LH-1)	165	38 ± 11
Throw-out	155	40 ± 15
Shallow oven (FG/5,6)	80	102 ± 20

TABLE 3. Ovenstone measurements for S127/160.

Apparently there was a shortage of soil for covering the raised-rim oven, because it had been made in the same place as a previous oven. Additional soil was obtained immediately to the west of the rim. It also appears that Pit 3 furnished additional soil for covering the oven and would, therefore, be a borrow pit. A similar kind of pit was found at another excavation at Landsborough Road near Timaru (Fankhauser, 1986: 53-63).

The shallow oven must have been made at the same time as the raised-rim oven because it was dug into the throw-out layer and covered by throw-off. The ovenstones used in the shallow oven are the same size as those of the raised rim oven (Table 3). Shallow ovens of a similar type were also found at Landsborough Road where an umu ti had apparently been used at least three times leaving shallow ovens at different levels in the throw-out debris. I believe the shallow ovens served a ceremonial purpose (umu karakia). This is described in an anonymous account on the preparation of kauru (cooked ti):

"On the evening of the night before the time when the people started to work the kauru, a fire was kindled to roast the kouka (base of the shoot) of the Ti. That act was for the tohunga alone to perform, then all the people went up, each individually to give his own kouka to the tohunga. When the karakia began that tohunga or those tohunga would put the kouka they had been given onto the fire. When it was ready, at the proper time, it would be plucked out to one side. Ritual chants were chanted ...Each hapu had its Tohunga do likewise." (Anon, n.d.:3)

Since returning to Hawaii, I have discovered that the practice of making two ovens (one for cooking food, imu [hangi], and one for ceremony) still exists among some Hawaiians.

Radiocarbon dates from this site and others (34 total) reveal that umu ti were in use during the entire prehistoric period in South Canterbury. The Maori would have brought the technology of Cordyline cooking with them to New Zealand.

There is some indication that ovens and ovenstone sizes increased over time. Also, ovens changed from circular to oblong shortly before the beginning of the historic period.

Recommendations for site surveying and excavating of umu ti

Umu ti are found in all types of terrain. Once a pit is found it should be checked as a possible oven or umu ti. This is most easily done by using a thin metal rod made of spring steel about 30 cm in length. I have used a metal tent

stake. Probe in the centre of the pit and towards the edges. If stones are detected - usually about 10 cm below the surface - it is likely to be an oven. However, the area around a pit should also be probed because the ground itself can be stony giving a false reading within the pit. Remember too that umu ti were re-used, so there may be rock debris within 3 m of a pit. If there are no stones at a distance of 4 m from the outside of a pit which contains stones, then the pit is almost certainly an oven. If a pit contains no stones and there are no other pits in the area, then the pit is not an oven (and not a borrow pit). If there are other pits which contain stones in the area, then a pit which does not contain stones may be either a former oven with the stones removed or a borrow pit.

Of course, the only way to be absolutely sure if a pit is an oven is to excavate it. I suggest excavating a 50 cm wide trench as shown in Fig.4. This represents a minimal disturbance to the site, but still allows one to gain some useful information. Start by running a line from the pit centre to at least one metre beyond the rim or outside diameter. Place a line parallel to the first line at a distance of 50 cm. Excavate starting from the outside and work towards the centre following natural soil layers. If the pit is an oven, then throw-off (and throw-out) can be expected around the perimeter. Throw-out (charcoal, fired stone) can also be expected if the oven was re-used. Soil samples (topsoil, soil between stones, and natural) should be collected for possible future thermoluminescence (TL) dating and residue analysis (see Fankhauser, 1986:86-94), 103-176). Soil samples from about 4 m away should also be collected to act as controls. One to two kilogram bags are enough. Ovenstones should be counted and weighed to determine mass per ovenstone; the total ovenstone mass of the oven is found by weighing the ovenstones in the trench and then using the equation, total ovenstone mass = (stone mass in trench $\times \pi r^2$) / area of trench containing stones. About 5 kg of stones should be saved for TL dating. Charcoal samples should be collected for radiocarbon dating. The completed excavation will reveal a cross section for an oven which can be drawn.

It is advisable to probe within 2 m of the outside of an oven to find any stone concentrations which could be ceremonial ovens. I think umu karakia may be ubiquitous with umu ti. They should be near the surface.

Umu ti have no prehistoric faunal material or artefacts associated with them. This would be expected for large earth ovens which were only used for cooking ti.

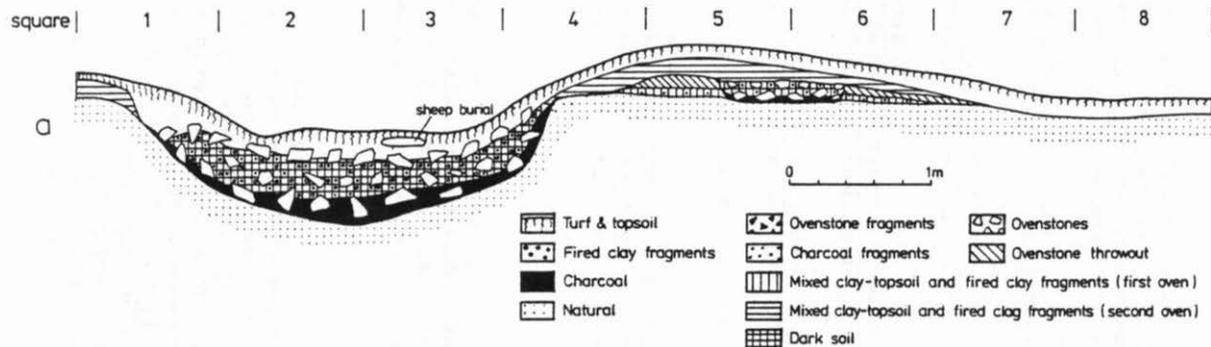


FIGURE 7. S127/160 cross-section; face F/G through centre of raised-rim oven, see Figure 6.

Conclusions

Cordyline was used throughout Polynesia as a carbohydrate source. This use was most evident in southern New Zealand where numerous remains of umu ti still exist. However, based on my ethnographic research, I believe that umu ti are also prevalent in the North Island. To help with this identification the characteristics of umu ti have been presented. These include locations, sizes, and excavation results such as total ovenstone masses and mass per ovenstone, site plans and a cross section. Pit sites are numerous in the North Island; and using the methods outlined above should reveal that some are actually earth ovens which were probably used for cooking ti.

Acknowledgements

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