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SOME EVIDENCE FOR EARLY AGRICULTURE IN HAWKE'S BAY

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Hawke's Bay has been a rather neglected area of New Zealand since the death of J. D. H. Buchanan, one of the founders of the Association's site recording scheme. With its favourable climate, its extensive ocean beaches backed by low hills and coastal plateaux and a hinterland penetrable by a series of rivers, the Tutaekuri, the Ngaruroro and the Tukituki, southern Hawke's Bay had much to offer early Maori settlers making their way south along the coast. Finds from middens on Ocean Beach at Waimarama and from the Simcox Collection in the Hawke's Bay Museum at Napier include archaic material, which has also been recovered from the surroundings of Lake Poukawa, south of Hastings. On general grounds then this is an area where evidence for early agriculture might be expected.

The proof came from excavations at Tiromoana pa, Te Awanga, in 1974 (Fox 1974a). This is a pa defended by transverse ditches and by lateral palisades on the end of a 150 ft spur overlooking the Maraetotara River, about quarter of a mile inland from the river's mouth at Te Awanga. Radio-carbon dates from the butts of large totara posts recovered from the deep holes of a fighting stage, indicate that the site was fortified in the mid to late 15th Century A.D. (C14 dates of A.D. 1520 and 1380 ± 60), although there had been an earlier lateral palisade discovered in 1975 which is as yet undated.

The site, however, had been occupied much earlier: at the narrow tip of the spur, there was an obvious habitation site (Site 2) consisting of a levelled and a built-up area alongside a large raised-rim pit, but separated from it by the customary external drain. The whole unit was shut off from the rest of the pa by a low bank or by a scarp.

Excavation showed that the built-up area was deep in black occupation soil, up to 0.5 m, in which a series of small post holes were found at varying depths with some difficulty. These made no coherent plan but seemed to belong to a succession of rectilinear structures. The levelled area proved to have been constructed on top of two earlier structures; the upper was a cooking place 30 cms deep in ash and charcoal, containing eight distinct scoop-hearths, some superimposed and one with stakes beside it. There was much food debris: the fish bones identified by Foss Leach were from red cod, snapper, school shark, and ray: the bird

and animal bones, identified by Ron Scarlett, included kaka, harrier hawk, and extinct swan, as well as dog and rat. The small blades of chert and pieces of obsidian from the deposit examined by M. Morwood had been used for cutting up the flesh. Shellfish were nearly all mussels with some paua, cook's turban and one trumpet shell, derived from the rocky shores. The radio-carbon date from one of the hearths was 1500 ± 70, showing that this occupation was contemporary with the defended enclosure.

The lower structure was a rectangular pit (Pit B) 4 m by 2½ m in which about 30 cms of fine humic soil had accumulated before the hollow had been used for cooking, indicating a fair lapse of time between the two constructions. The pit roof had been supported on three central posts (Type 1, Fox 1974b, Fig. 1) set in holes 25-30 cms deep. One of the end posts (Post 3) must have decayed because it had been replaced by a smaller timber and the original hole repacked, again indicative of a prolonged use of the pit. From the other end post (Post 4) pieces of decayed wood were recovered and yielded a radio-carbon date of A.D. 930 ± 120; this is the earliest yet obtained from any controlled excavation of an agricultural settlement site so far as I am aware. It can be compared with the date of A.D. 1170 ± 60 from a pit in Skipper's Ridge settlement at Opito (Davidson, 1973, p. 50) and two of 1180 ± 54 from a house in the Moikau Valley in the Wairarapa (Prickett 1972, p. 164).

The early date from Te Awanga is supported by another of A.D. 1200 ± 80 obtained from a central timber upright in the floor of the nearby raised-rim pit, Pit A. This was a pit of much greater capacity and of more sophisticated construction. It measured 9 x 6 m and was over 1 m deep below the 0.5 m high rim: it had an end door with a timber sill and there were traces of internal divisions or bins on the floor, and possibly of a timber lining. It presumably replaced Pit B which was then abandoned and began to silt up. The archaeological sequence thus runs -

(1) Pit B, dug in the 9th or 10th Century. End post decayed and replaced before pit was abandoned.

(2) Pit A with raised rim dug in the 12th or 13th Century; Pit B silts up.

(3) Pit B re-used as cooking place in the 15th-16th Century, during the main occupation of the pa.

The existence of two sizeable roofed storage pits, both suitable for storing crops of kumar or fern root implies that there were agricultural

communities using the Tiromoana ridge well before the building of the pa. Field survey has shown that this type of open settlement was common in the district. On the hills inland from Te Awanga, there are many pit groups, some associated with levelled house sites, which are sited on high points on the ridges, but, although easily defensible, there are no signs of earthwork defences. Without excavation it is impossible to say which - if any - of these are early settlements, and which ones are contemporary with the Tiromoana pa, which would afford a refuge for the people from a wide area in case of trouble.

This account of the indications for early agriculture at Tiromoana raises two problems: first the reliability of radio-carbon dates derived from wood when unsupported by any dateable artifacts; and, secondly, the length of time that a storage pit can be used.

It is generally agreed that a single radio-carbon date is unsatisfactory. At Tiromoana, thanks to Dr Rafter and the Nuclear Sciences Laboratory, there are eight with four more to come. With one exception - a date of 1960 B.C. from a door slab in Pit A, which presumably was made from driftwood - the dates are in order and conform to the sequence established by archaeological means. There is no justification for discarding any one of them because it does not conform with preconceived ideas. If a date in the 15th Century is acceptable for the defences because it is in accord with similar evidence from other sites, so should be the early date for the pits and the agriculture they imply.

The purist may object to the use of any wood other than twig charcoal for carbon-dating. Whilst this may be desirable, the major structural problems of a site are unlikely to be resolved from the date of a domestic hearth - for these we must rely on the precious fragments of the posts themselves which fortunately survive in their earth sockets from time to time. If the dark core of soft soil, which usually marks the actual position of the post in the much larger hole or post pit, is measured at its base and the wood identified, it is possible to estimate the age of the tree. The timbers used in the early storage pits at Te Awanga were totara with a basal diameter of approximately 25 cms. Totara samples examined in Auckland by Paul Smith showed that the growth rings varied in width from 1 to 3 mm. He comments, "If we assume a uniform ring width of 1 mm throughout the Te Awanga post, then the age would be 125 years; alternatively, a uniform width of 3 mm would give an age of 75 years. This simple calculation hence provides the age limits, and I don't feel any more definitive estimate can be given." However, a post between 75 to 125 years old can only marginally affect the date, since the error is practically contained within the standard deviation of ± 120 years. These considerations strengthen the reliability of the radio-carbon dates at Tiromoana.

Turning to the problem of the life of storage pits, it has frequently been stated that these could not be used for any length of time due to the moulds which caused the kumara to rot and which then infected the pit. This concept was based on the number of intercutting pits and on others deliberately filled up, found at sites like Kauri Point pa (Golson 1961, p. 54), at Ongari Point (Shawcross 1966, p. 62) and on Skipper's Ridge, Opito (Davidson 1975). On the other hand, the orderly arrangement of rectangular storage pits in blocks or regularly aligned as at Taniwha pa (Green and Law 1972, Fig. 2) is evidence to the contrary; these are unitary layouts that must have remained unmodified during the occupation of the site, even if some pits were not used from time to time. At Tiromoana, if the evidence of the radio-carbon dates is accepted, it appears that the early Pit B on Site 2 was in use for a minimum of 70 years and could be for very much longer. It therefore seems likely that some way of disinfecting the pits was employed.

In Britain the same problem has been encountered in the use of grain storage pits of the Iron Age (600 B.C. - A.D. 43). These are cylindrical pits, often a little undercut to a beehive profile, 1.25 m to 2 m in diameter and up to 2 m deep. Ever since Bersu's excavation of the Little Woodbury settlement in Wiltshire (Bersu 1940), where a plethora of pits were found, it has been assumed that pits could be used only for a few years before they became infected, and had to be filled in with domestic rubbish. Recent experimental work using cylindrical and beehive pits of average size at the Butser Ancient Farm project in Sussex carried out by Peter Reynolds has demonstrated that this is not the case (Reynolds 1974, p. 128). Although residual colonies of the more active micro-flora remain in the pit walls after a pit has been emptied, it has been proved that 'firing a pit by means of an intensive brushwood fire even for a short time successfully sterilises it, and that simple cleaning of the walls to remove the green algae radically reduces the infestation level.' Surprisingly, the traces of fire disappear completely after a few weeks of wind and rain. Reynolds concludes that 'the functional life of a pit would seem to be unlimited.' (1974, p. 130). Was it the same in New Zealand? The kumara pit was used by the Maoris until very recent times and Mr Simmons tells me that it would normally last a lifetime without any special attention. Care was always taken in selecting sound kumara, in stacking them in tidy heaps clear of the walls, and bracken was generally laid on the floor to prevent bruising. In early times when the crop was in, the *tohunga* placed a *tapu* on the storage pits, as described by Richard Cruise and other early 19th Century writers (Cruise, 1820 p. 83).

Despite the obvious differences in the constructions, the analogy with the British grain pits is worth pursuing. Unlike the British pit, the walls of the Maori storage pit were not in contact with the crop, being usually separated from it by an internal drain. It was the floor that needed disinfecting: burning up the dry bracken on which the kumara had been bedded would probably suffice and would leave very little residue for the archaeologist on most occasions. In several excavations, however, remains of small fires and patches of charcoal have been found on the pit floor, for example at Skipper's Ridge, Ongari, and Kauri Point pa and Kauri Point open settlement (Green 1963, p. 151); in fact they were a source of the misconception prevalent in the 1960s that the pits were designed to be lived in (Golson 1961, p. 54). In an unpublished paper in 1967 to the N.Z.A.A. Conference, Ambrose disclosed that in one of the larger pits excavated at Kauri Point pa as many as seven fire hollows were found, each sited in a different place on the floor. Most were burnt red to a depth of 1 cm, but the charcoal and ash had been cleaned out leaving only a smear and the hollow carefully refilled with clean soil and smoothed over; in other words, the floor of the pit had been made good about half a dozen times. This is certainly indicative of periodic disinfecting, as Ambrose himself concluded, and consistent with the results of the British experiment.

Why then were some pits abandoned? At Tiromoana it seems that a larger pit was needed, which must reflect the success of early agriculture and an extension of the cultivated ground. It would be interesting to know if this is true of other excavated sites, where a pit succession has been demonstrated, as at Ellett's Mountain or Skipper's Ridge. In Britain, Reynolds has suggested that in exceptional weather conditions, seepage into the pit might occur, producing a stinking mass of rotted and fermenting grain, so repellant that the pit was abandoned. Equally in New Zealand, the rot might set in amongst the kumara due to seasonal factors and the whole crop be lost. The failure of the pit might then be ascribed to an infringement of the *tapu*, and another one dug in its place. There are some things that an archaeologist is unable to prove but unless we ask ourselves questions, we shall not be aware of the answers when we find them.

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