NEW ZEALAND JOURNAL OF ARCHAEOLOGY

Comments on D. G. Sutton's Paper: 'A Paradigmatic Shift in Polynesian Prehistory: Implications for New Zealand'

N. J. Enright and N. M. Osborne

Geography Department, University of Auckland

ABSTRACT

We review the palynological and geomorphological evidence used by Sutton (1987) to support his hypothesis that settlement of New Zealand by Polynesians occurred substantially earlier than A.D. 800. Several sources of evidence are misinterpreted, while others are more reasonably interpreted as natural events rather than as evidence of human presence. While we do not dispute that Polynesian arrival in New Zealand may substantially predate the oldest known archaeological sites, we cannot support an earlier settlement based on the evidence presented by Sutton.
Keywords: FIRST SETTLEMENT, GEOMORPHOLOGY, PALYNOLOGY, ARCHAEOLOGY, KAHAROA ASH, RADIOCARBON AGE, CHARCOAL.

INTRODUCTION

Sutton (1987) has written a controversial paper about the possible date of first settlement of New Zealand by Polynesians. He re-examines palynological and geomorphic evidence from a number of sources, and places his own interpretations on these data. Fundamental to his argument are several points. First, that most workers have assumed a human history spanning only about the last 1200–1000 years and that this has led to a blinkered interpretation of the available evidence. Second, that interpretations of indirect evidence of human presence (i.e., fire and certain pollen types indicative of forest clearance) have been unduly conservative. And third, related to those above, that most workers have sought to define the start of rapid forest clearance, a phase which may substantially postdate actual arrival time. Sutton goes on to consider ethnological and archaeological evidence for repeated settlement up until the sixteenth century. We wish to review the assumptions and evidence used by Sutton with reference to the first part of his paper, that is, the palynological and geomorphological evidence for dating the first arrival of Polynesians in New Zealand.

Reconstruction of post-glacial environments in New Zealand has enabled interpretation of gross changes in vegetation and climate over the last 20,000 years. Where vegetation change is rapid, and not consistent with accepted climate trends, then other explanations may be required. One set of such changes occurs at many sites in the period 800–600 years B.P. (McGlone 1983a). This time frame falls within that for which direct archaeological evidence of Polynesian presence in New Zealand exists. Even so, other events, such as Kaharoa ashfall in the northern North Island, also correlate closely with vegetation changes and coastal instability at this time and cannot be ignored as possible causal agents (McGlone 1981; Pain 1979; Pullar and Selby 1971).

One must be careful neither to attach undue significance to minor changes in pollen percentages, nor to interpret traces of certain pollen taxa (e.g., bracken, grass) and charcoal particles as evidence of human complicity in vegetation change. By and large, the evidence does not, and cannot, discriminate between human and "natural" causes of fire and forest

New Zealand Journal of Archaeology, 1988, Vol. 10, pp. 139–146.

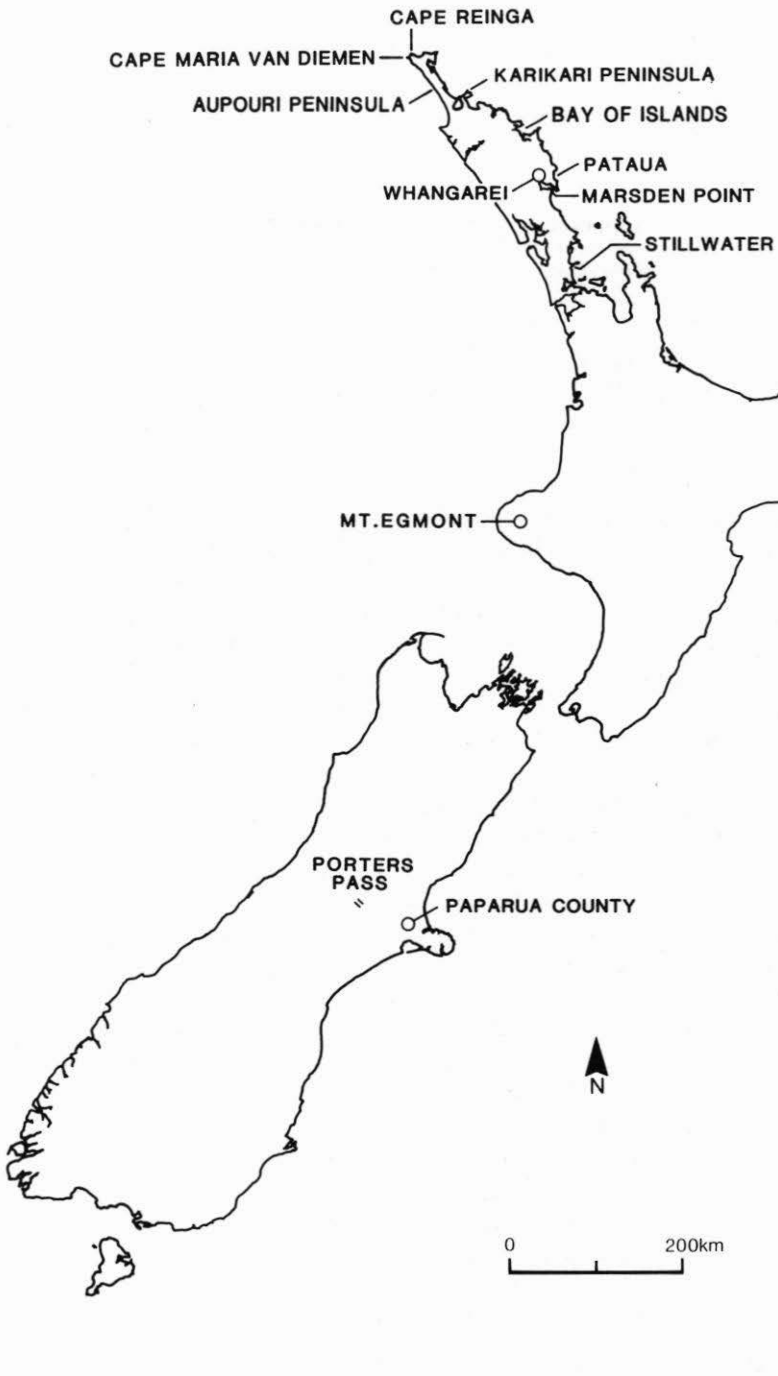

Figure 1: Location of field sites discussed in the text.

clearance. It is difficult to accept that strong evidence for earlier settlement of New Zealand would be overlooked simply because research had started with the assumption of settlement at about 1200–1000 years B.P. McGlone (1983a) assumes this age on the basis of available direct archaeological evidence, and of his own interpretations of pollen data from a number of sites.

REVIEW OF THE EVIDENCE USED

We review in turn nine of the sources of palynological and geomorphological evidence used by Sutton (1987) to support his argument for first settlement of New Zealand between 0 and 500 A.D. (1950–1450 years B.P.).

1. Sutton places the onus on palynologists to "prove" that certain kinds of change in the pollen record are due to "natural" phenomena and not to human activities. For example, in reviewing evidence presented by McGlone (1983a), he states that fire at Porters Pass is not shown to be natural, and changes at Mt Egmont are not shown to be caused by volcanic activity (Sutton 1987: 139). Such a stance may be defensible for events during the known period of human settlement in New Zealand when the probability of human agency is relatively high. However, we would argue that it is up to archaeologists to "prove" that events which predate known settlement are in fact due to human activity since the probability of human agency is then much lower.

2. Sutton (1987) considers that palynological evidence provided by Chester (1986) is suggestive of first settlement in the Bay of Islands, New Zealand, by A.D. 550–600 (1400–1350 years B.P.). Chester defines specific criteria for the recognition of cultural influences, namely a continuous charcoal record with associated indicator pollen types such as bracken and grass, and increased silt influx. These are indicators of vegetation disturbance, probably by fire, resulting in replacement of forest by non-forest vegetation. We must stress that these criteria may reflect either fire associated with human activity, or natural fire events. The age of first settlement suggested from Chester's work is dependent both upon the validity of the criteria noted above, and the accuracy of the timescale attached to the pollen record. The proposed timescale is heavily dependent on the age assigned to the Kaharoa ash marker horizon which is used to fix the age in the middle section of cores from Waitangi site 1 (ash present) and 2 (ash absent, but position inferred). Chester (1986) assigns Kaharoa ash an age of 930 ± 70 years B.P. (NZ10), following Pullar *et al.* (1977). Most workers now use an age for the Kaharoa event of 650–670 years B.P. based on a number of more recent radiocarbon determinations (NZ1765C, NZ4991, NZ4804; McGlone 1983a, 1983b).

Sutton avoids the issue of the true age of Kaharoa ash by noting (1987: 150, note 5) that his revision is independent of this controversy, although he concedes that it may affect the arrival date proposed by Chester (1986). We consider that this issue should have been addressed more fully, since the work of Chester (1986) is quoted as adding voice to Kirch's (1986) argument against continued use of the orthodox scenario of Polynesian prehistory, and appears fundamental to the development of Sutton's arguments.

Chester's use of the older age for Kaharoa ash, and the assumption of a linear relationship between age and depth for the Waitangi cores, pushes back the projected age of first cultural activity, based on her selected criteria, by about 120 years (calculated by rescaling between the Kaharoa ash and basal radiocarbon date of 1730 ± 75 years B.P. (NZ6546) for Waitangi core site 1, and between the inferred level of Kaharoa ash and basal radiocarbon date of

1805 ± 80 years B.P. for Waitangi core site 2). At Jack's Lake, also in the Bay of Islands, evidence for first cultural activity is not found until A.D. 1400 (Chester 1986). Here, dating of the core is based solely on radiocarbon analysis with major change commencing at a level dated to 520 ± 70 years B.P. (NZ6559). Major change in the Waitangi cores occurs above the Kaharoa ash and so an age closer to 650–670 years B.P. seems reasonable (in conjunction with the Jack's Lake evidence) rather than the earlier age of about 930 years B.P.

Whether a low frequency tail of charcoal, grass and bracken, relating to human activity, can be separated from "natural" background levels is questionable. Recent studies near Cape Reinga in the far north (Dodson *et al.* 1988; Enright *et al.* 1988) show continuous charcoal influx at two swamps for about 15,000 and 3000 years respectively. Charcoal influx at Paranoa swamp shows a number of peaks suggesting a "natural" role for fire at this site since the last glacial maximum. Bracken spores and grass pollen occur in low frequency throughout. At Te Werahi swamp, low levels of charcoal are present from about 3000 years B.P., but values increase markedly between 2620 and 2150 years B.P. Levels of bracken and grass rise only in the uppermost sample, well above the point of increase in charcoal.

In conclusion, use of the commonly accepted age for Kaharoa ash revises Chester's age of first cultural activity to around 1250 years B.P. even if we accept her criteria for recognising human arrival. We do not accept these criteria as applied here since the tails for charcoal, grass and bracken, although slightly different between cores, are relatively stable for hundreds of years in the Waitangi sites. This stability is difficult to explain if people are present. Furthermore, continuous charcoal curves from other sites in Northland exist for even longer periods of the Holocene and cannot be associated with human activity unless we postulate arrival between 3000 and 2000 years B.P. The absence of direct archaeological evidence then becomes even more of a problem.

3. Sutton (1987) refers to work by Osborne (1983) which identifies "a major burning horizon near Marsden Point, which may be dated by association to *circa* 1400 years B.P." Osborne recognises no such horizon. Charcoal was found in association with Kaharoa ash in five isolated soil sections which were exposed in eroding foredunes near Marsden Point. It is not known whether the origin of charcoal was anthropogenic or natural burning. The charcoal is likely to equate closely with the age of Kaharoa ash, that is about 650–670 years B.P. Sutton's assumption as to the age of the horizon is almost certainly erroneous and is not presented in Osborne (1983).

4. The Pataua site described by Cox (1977) is worthy of further investigation. He describes scattered burnt stones, perhaps part of an oven, enclosed in Taupo ash (an associated wood sample gave a radiocarbon age of 1795 ± 65 years B.P., NZ1764C). However, the site has not been examined by archaeologists (Cox pers. comm.).

5. Reference to an intensively burnt soil at Puketurua, west of Whangarei, should specify that the dated sample (1580±65 years B.P., NZ1712) was a tree trunk associated with a burned horizon found in a gully fan deposit (Schouten 1973). Cox (pers. comm.) acknowledges a likely inbuilt age of at least 30 years for the sample (fossil record form N19/f655), however, the true inbuilt age could be much greater since it is not known how much of the stem was removed by fire and subsequent decomposition. This sample is from one of several buried horizons dating to about 200, 400, 800, 1550, 2700 and 7700 years B.P. Of these, all but the 2700 years B.P. layer contained abundant charcoal. Burial of each layer suggests major erosional phases within the fan's catchment. There is no compelling reason

to suppose that the event at about 1550 years B.P. was the result of human disturbance since this site shows an earlier history of catchment instability in the absence of people. However, human agency cannot be discounted for events since 800 years B.P. which both fall within the known period of human settlement and occur more frequently than in earlier times.

6. Reference to a burnt shell horizon at Stillwater, near Whangaparaoa, which dates to 1440 ± 60 years B.P. (Cox 1973, Cox pers. comm.) is largely irrelevant. The deposits are not middens but are thought to be natural shelly spits of estuarine origin. While Maori influence near the surface is not ruled out, the sample referred to by Sutton is from a depth of 0.90–1.05 m. Cox (pers. comm.) notes that the shells at this level were slightly grey, a characteristic of shells exposed to heat, but no charcoal was present. The original fossil record form (N38/f645) states that there is no possibility of Maori midden influence at this level. The circumstances under which these shells became somewhat grey are not clear; however, our field examination suggests staining of the shell due to a combination of weathering and the leaching of fine clay minerals from the overlying soil.

7. Evidence from Cox (1978), and Cox and Mead (1963), concerning vegetation in the Paparua County, Canterbury is misinterpreted and does not support an early date for Polynesian arrival. Cox (1978) notes that kanuka (*Kunzea ericoides*) scrubland was common at about A.D. 1000 (950 years B.P.). Sutton (1987) uses this evidence to suggest the "occurrence of earlier and extensive fires". Cox specifically states that kanuka was common on shallow, stony soils where it may have been the climax vegetation type. Podocarp forest was present (including kanuka) on deeper soils. Charcoals, representing presumed natural fires, have been dated to 6495 ± 95 years B.P. and 3500 ± 70 years B.P., while two samples dated to 1110 ± 76 years B.P. and 1015 ± 75 years B.P. may fall within the Polynesian period. Cox assigns the latter samples a probable true age of about 900 years B.P., presumably to take account of possible inbuilt age. Sutton's reference to "soils of the Waimakariri age group, deposited within the interval 2400–700 B.P." is not relevant. Cox and Mead (1963) note two depositional events (or phases), one around 2400 years B.P. and the other around 900–700 years B.P. The earlier phase is interpreted in terms of climatic change, while the latter (because of associated charcoal evidence) may reflect human activity. Cox (pers. comm.) found no evidence of occupation on the pre-Waimakariri landsurface.

8. Fleming and Powell (1974) used a radiocarbon date of 2140 ± 90 years B.P. for a flax snail (*Placostylus ambigiosus priscus*) sample to suggest the possible timing of sand dune advance near Cape Maria van Diemen in the far north. They considered that fire was the most likely trigger for this advance. Cox (1977) called into question such dates because of a possible inbuilt age of up to 900 years in snails caused by incorporation of old carbon into their shells. However, dates on both flax snail and wood from the same area (Millener 1981), and the dated rise in charcoal particle abundance (between 2620 ± 90 years B.P. and 2150 ± 100 years B.P.) within the nearby Te Werahi wetland (Enright *et al.* 1988) support Fleming and Powell's original interpretation of forest reduction by fire and subsequent advance of sand dunes by about 2100 years B.P. Millener (1981) notes, however, that fossil bird remains are consistent with the survival of substantial areas of forest until 1000–500 years B.P. In addition, Taylor (1984) found kokako and seal remains in a midden from the same area, shell from which dated to 668 years B.P. He considered this site to represent an early phase of resource exploitation in the far north. Again, we would suggest that the earlier evidence for disturbance (which is beyond the range contemplated even by Sutton) is probably not related to human activity. This assertion is supported by

the rise in charcoal influx at Te Werahi long before any rise in bracken and grass (Enright *et al.* 1988).

9. Hicks (1975) describes the evolution of landforms of the southern Aupouri and Karikari Peninsulas. One radiocarbon date for kauri wood (1860±40 years B.P., NZ2703C) suggests survival of kauri forest on Aupouri parabolic 2 dunes until at least this time. This surface was subsequently buried, in part, by the more recent Aupouri parabolic 3 dunes and Aupouri transverse dunes. Hicks (1975), using an assumed Polynesian arrival date of 1450–1150 years B.P. after Wellman (1962), comments that Polynesian burning since 1500 years B.P. may be implicated in forest destruction and dune mobilisation. It is this statement that is used by Sutton to support his case for early Polynesian arrival in New Zealand. Closer examination of Hicks (1975) reveals that loss of forest, and development of Aupouri parabolic 3 dunes was probably well under way by 2000–1500 years B.P. Hicks (1975) refers to a date of 3140 years B.P. for a *Dacrydium kirkii* stump representing forest also destroyed by the parabolic 3 dunes. It is the more recent, Aupouri transverse dunes, which Hicks associates with Polynesian presence. He comments that development of transverse dunes implies massive destruction of coastal forest, and that presence of charred stumps, burnt soils, middens and earth ovens testify to the former occupancy of the coastline. The work of Coster (n.d.) indicates that the oldest midden sites on this coastline date to about 600 years B.P. It thus seems likely that the parabolic dune sequences reflect natural processes of forest death and coastal erosion associated with sea-level rise, and perhaps climatic change. Evidence of human activity is restricted to the transverse dunes which date to within the last 600–700 years.

CONCLUSIONS

We do not dispute that Polynesian arrival in New Zealand may substantially predate the oldest known archaeological sites. However, we cannot accept a much earlier date for settlement based on the palynological and geomorphological evidence provided by Sutton (1987). We believe several sources used are misinterpreted, and others are interpreted in a way that ignores more reasonable conclusions. Establishment of an earlier arrival date must depend, finally, on discovery of cultural deposits. If indirect evidence from palynology and geomorphology is to be used as a partial surrogate, then a much more substantive, and unambiguous data set will be required.

ACKNOWLEDGEMENTS

Thanks to Matt McGlone, Ted Cox, John Coster and Doug Hicks for discussion, or communication, concerning their field evidence.

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Received 29 February 1988