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"SUCH AS ARE SEEN ON LAND THAT HAS BEEN PLOUGHED":SLOPE LINES AND PLOUGHING METHODS

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A wide range of relict features in the New Zealand landscape date from the historical period. Some of these features take forms that may cause them to be mistaken for features of greater antiquity. Two sites in Canterbury that had been long thought to be pa have been shown to be ditch and bank enclosures associated with early European farming (Trotter, 1976; Scarlett, 1977).

Ploughing has also left its imprint on large parts of the landscape and in some settings the plough lines have been mistaken for prehistoric field systems. The similarity in form was noted by Best when he described "parallel depressions" at a site in the inland Bay of Islands and noted that although the land could not have been ploughed (because of the numerous rock boulders) the remains were "such as are seen on land that has been ploughed" (Best, 1976:126). More recently Prickett (1981:133) has noted the similarity between the remains left by ploughing and those commonly identified as characteristic of field systems.

Field systems

The type of site referred to here as field systems also go under a number of other, mostly inadequate, names. These range from those that link context and feature ('slope lines') to those that speculate about function ('drains'). However, the 'lines' are found on both slopes and flats and while the ditches are often referred to as 'drains' it is more plausible in most contexts to consider them as boundary markers (Nicholls, 1965:140; Peters, 1975:178; Leach, 1976:129).

The available literature on these 'drains' is sparse. They are occasionally mentioned in the ethnographic literature: Walsh (in Best, 1976:130), for example, noted that "the clay hillsides of the north are covered with surface drains".

In 1965 Nicholls reported shallow depressions extending down slopes and across flats at Tupou Bay (N7/56) (Nicholls, 1965), and during the 1964-65 excavations at Paeroa pa on Moturua Island Groube (1966:11) tested a slope garden (N12/6). Further excavations were carried out in 1968 on both the slope (N12/6) and the adjacent flat (N12/8) (Peters, 1975).

Peters (1975:172-173) describes N12/6 as being situated on a south facing slope of some 20°. There were three surface ditches running some 20 m straight down the slope and a fourth which turned and joined up with the adjacent channel. The ditches were considered to be contemporary with the undated later soil (Layer 2). Leach's claim that the ditches date from the 13th to 15th centuries (Leach, 1976:129, 1979:244) is incorrect.

Despite the increase in the identification of field systems details remain meagre. Most reports are phrased in very similar terms. Kennedy (1969:105-106) reports ten sites in the south-east Bay of Islands: seven on sloping ground and three on flats behind bays.

"Both the sloping and the nearly flat series are in parallel rows, the former usually at a slight angle to the direction of slope, and the latter running with the slope, at right angles to the beach front."

(Kennedy 1969:106)

At Mimiwhangata Calder (1973:6) noted "shallow linear depressions which generally run straight downhill". On Great Barrier Island Coster and Johnston recorded "three parallel shallow ditches descending a gentle slope" (Coster and Johnston, 1975:N30/68) and "four parallel shallow ditches running down a grassed slope" (Coster and Johnston, 1975:N30/83). Atwell (1975:39) noted a "series of parallel lines down slope" at a site on Waiheke Island. Douglas and Nugent (1975:9) reported "narrow shallow ditches running down hills" at sites on the South Kaipara Peninsula. Leahy and Walsh (1976) have described flat ground showing well defined long narrow depressions and sites with "a series of long narrow depressions which extend downhill" in the Bay of Islands.

Unfortunately these descriptions leave open the question of whether the features seen are field systems or the result of ploughing.

#### Ploughing methods

There are a number of different ways of ploughing an area: systematic ploughing, round and round ploughing, and one-way ploughing (Shippen and Turner, 1974; Harris, Muckle and Shaw, 1974).

Systematic ploughing or ploughing in 'lands' is an old, and still common, method of ploughing. Because the plough always turns the furrow-slice in one direction the ground is ploughed in long, narrow strips called 'lands'. Work starts in the centre of the strip and ploughing is done alternatively on either side of the

central furrows (or 'ridge') with the soil always thrown inwards. When one land was completed a ridge was formed as the centre of the next land and the pattern repeated (Orwin and Orwin, 1967:32-33). Since each furrow-slice is turned towards the centre of the land where two lands meet there is a furrow of the width of two slices where soil is thrown in opposite directions. It is these that survive as long narrow depressions in the present landscape.

Lands tend to be long and narrow so that the minimum amount of time and energy is spent unproductively moving from one side of the land to the other to plough the next furrow. With tractor-mounted single or multi-share ploughs which can be raised and lowered hydraulically lands have tended to get wider.

Round and round ploughing, as the name suggests, involves ploughing round and round and is an alternative way of handling the fact that the earth is always thrown to the right. It is much faster than ploughing in lands and is widely used where conditions are suitable. This generally means a field of a reasonable shape and fairly level.

One-way ploughing requires the use of a reversible plough. The reversible plough is, in effect, two ploughs set back to back so that the plough can simply be raised and the whole thing flipped over. This makes it possible to return down the field in the opposite direction but still throw the earth in the same direction as before. Both round and round ploughing and one-way ploughing result in considerable savings in time and the ground is kept free of the surface undulations ('ridge and furrow') so characteristic of ground ploughed in lands.

#### Ploughing by the early European settlers

The reversible plough is a recent development, and large areas of terrain are not suited to round and round ploughing. The early settlers ploughing in lands with single-share, horsedrawn ploughs turned over large areas of ground including considerable areas that were subsequently put into pasture. Later ploughing and discing has obliterated all traces in many of the more accessible areas but one place where traces tend to survive is on steeper slopes behind bays in the very places where archaeologists have come to expect to find field systems.

Unfortunately there is little information available about ploughing by early settlers in New Zealand. In South Australia a study of lands has shown that lands vary in width from 2 m to 18 m but the average width is 5-6 m. Lands of a width greater

than 10 m are rare (Twidale, 1971:217). Lands near Martins Bay on the Mahurangi peninsula range from 2 m to 12 m but are commonly about 5 m wide (Walton, 1976).

Lands run across, or occasionally at an oblique angle to, the contours. Ploughing was done up and down slopes rather than across them for a number of reasons. Ploughing along the contour caused problems of balance, a tendency for the plough to swing away downslope ('crabbing'), and if the furrow-slice was thrown uphill it tended to fall back and choke the plough (Twidale, Forrest and Shepherd, 1971:501). Remnants of lands were found on slopes between  $7^{\circ}$  and  $10^{\circ}$  with some on slopes of  $15^{\circ}$  (Twidale, Forrest and Shepherd, 1971:494). Lands in Martins Bay are also found on slopes of that order but some are on slopes greater than  $15^{\circ}$ . Some of these lands had been formed in the first decades of this century according to local residents.

### Discussion

Ploughing in lands creates a pattern of gentle undulations across the surface of the ground and these may survive: Leahy and Walsh describe sites on flats in the Bay of Islands where the ground between the parallel linear depressions was slightly raised (Leahy and Walsh, 1976:N12/3, N12/82, N12/83, N12/87). N12/82 is described as having "parallel depressions between raised portions of land 6-9 m in width". This site and two others (N12/83, N12/87) are on ground that is not very well drained. Improved drainage was a widespread motive for creating a ridge and furrow pattern. Slight mounding has also been noted at a site in the inland Bay of Islands (Spencer and Pidgeon, 1980). Leahy and Walsh (1978:19) have also described one site (N11/393) as having a criss-cross pattern of lines and this is entirely consistent with having been created by ploughing.

Brailsford (1981) describes a number of garden sites in the northern South Island. Of these at least one is almost certainly the result of ploughing (the site adjacent to S85/15, see Brailsford 1981:Plate 35).

Lands can be seen in many parts of New Zealand but often these are readily recognisable as resulting from ploughing. Setting is a major factor: archaeologists look for field systems on the slopes and the flats behind bays. For reasons already outlined this is one place where lands tend to survive.

While water on occasions has scoured out the furrows, often soil wash has made the remnants difficult to see except in suitable light conditions. The difficulty of detecting the lines often seems to serve as a guarantee of their authenticity; since they

are difficult to see they must be old. Many of the lines on Hamlins Hill (N43/137) in Auckland are difficult to see except when highlighted by the late afternoon sun. They are widely thought to be field systems but they are in fact the result of ploughing.

### Conclusion

Lands are long narrow strips of ground which on sloping ground run at right angles across the contours. The margins of lands survive in the present landscape as a series of parallel channels. Where these occur in certain settings they are easy to misinterpret as field systems of Maori origin.

It is difficult using the available literature to define what the characteristic features of prehistoric field systems are. The descriptions follow a well established form that does not provide ways of differentiating field systems from lands.

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### References

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|-------------------------------|------|--|
| Atwell, E.G.                  | 1975 | Site Recording in the eastern half of Waiheke Island. Unpublished report to N.Z. Historic Places Trust.                              |
| Best, E.                      | 1976 | <u>Maori Agriculture</u> . Dominion Museum Bulletin 10.  |
| Brailsford, B.                | 1981 | <u>The Tattooed Land</u> . Wellington, Reed.   |
| Calder, A.                    | 1973 | <u>Mimiwhangata : Archaeological Report</u> . Turbott and Hallstead for N.Z. Breweries Ltd.  |
| Coster, J. and<br>G. Johnston | 1975 | Report on the Kaitoke-Harataonga archaeological site survey, Great Barrier Island. Unpublished report to N.Z. Historic Places Trust. |
| Douglas, G. and<br>T. Nugent  | 1976 | Report on Site Survey : South Head, Kaipara. Unpublished report to N.Z. Historic Places Trust.                                       |

- Harris, A.G., T.B. Muckle and J.A. Shaw 1974 Farm Machinery. Oxford University Press.
- Kennedy, J. 1969 Settlement in the S.E. Bay of Islands, 1772. Studies in Prehistoric Anthropology, Anthropology Department, University of Otago.
- Leach, H. 1976 Horticulture in Prehistoric New Zealand. Unpublished Ph.D. Thesis, University of Otago.
- 1979 The significance of early horticulture in Palliser Bay for New Zealand prehistory. In B.F. and H. Leach (eds), Prehistoric Man in Palliser Bay, National Museum Bulletin 21.
- Leahy, A. and W. Walsh 1976 Bay of Islands and Kerikeri/Paihia area: Archaeological Survey Report. Unpublished report to N.Z. Historic Places Trust.
- 1978 Archaeological Survey Report: Puruerua Peninsula, Bay of Islands. Unpublished Report to N.Z. Historic Places Trust.
- Nicholls, M. 1965 Some probable pre-European agricultural evidence in Northland. N.Z.A.A. Newsletter, 8:148-9.
- Orwin, C.S. and C.S. Orwin 1967 The Open Fields. Oxford, Clarendon Press.
- Peters, K. 1975 Agricultural gardens on Moturua Island in the Bay of Islands. N.Z.A.A. Newsletter, 18:171-180.
- Prickett, N. 1981 Review of Australian Pioneer Technology: Sites and Relics. N.Z.A.A. Newsletter, 24:133-134.
- Scarlett, R. 1977 Whakaepa: investigations of site S74/9. N.Z.A.A. Newsletter, 20:25-27.

- Shippen, J.M. and  
J.C. Turner 1974 Basic Farm Machinery. Oxford,  
Pergamon Press.
- Spencer, J. and  
M. Pidgeon 1980 Waimate North - Puketona Survey:  
Inland Bay of Islands, Unpubl-  
ished Report to N.Z. Historic Places  
Trust.
- Trotter, M. 1976 Investigations at Otckitoki, Banks  
Peninsula. N.Z.A.A. Newsletter,  
19:119-123.
- Twidale, C.R. 1971 Farming by the early settlers and  
the making of ridges and furrows  
in South Australia. Tools and  
Tillage, 1:205-223.
- Twidale, C.R.,  
G.J. Forrest and  
J.A. Shepherd 1971 The imprint of the plough: "Lands"  
in the Mt Lofty Ranges, South  
Australia. Australian Geographer,  
11:492-503.
- Walton, A. 1976 Site Recording on the east coast  
of the Mahurangi Peninsula between  
Snells Beach and Martins Bay. Un-  
published Report to N.Z. Historic  
Places Trust.