CHAPTER 3

Maori land and livelihood AD 1250–1850

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During much of the past millennium the natural history of Canterbury was also a cultural history shaped, in some respects profoundly, by Maori settlement. Maori environmental relationships have been documented most comprehensively from the historical era, particularly the early 19th century, from which period survive many written observations of Maori settlement and activity and about which there are also numerous Maori recollections recorded from the later 19th and early 20th centuries. The influence of a European presence upon Maori behaviour, together with the cultural filter of European observation, must have produced some novelty in the evidence, but it can no longer be picked out readily. Nevertheless, these sources facilitate a broad and synchronous discussion of approximately traditional Maori land management and resource use.

An understanding of diachronic environmental relationships during the preceding 600 years of Maori occupation depends primarily upon archaeological data. These offer a comparatively narrow perspective. They arise exclusively from excavated samples of unknown representativeness made up of only those material remains that were resistant to the ravages of climate and time. In addition, by the historical contingencies of archaeological interest, they are distributed unevenly in time, being most comprehensive for the 13th to 15th centuries, and comparatively slight thereafter. Consequently, as archaeological and historical data are constituted very differently and barely overlap in content and time, they cannot be seen as complementary. The one constant is that environmental relationships occurred within a context of exclusively Maori occupation. A brief sketch of traditional history will help to set the material to follow in a cultural sequence.

In tradition, the first name of the Canterbury Plains, Ka pakihi whakatekateka a Waitaha (the seedbed of Waitaha), was given by Rakaihautu, captain of the *Uruao* canoe, who, disembarking at its landfall in Wakatu (Nelson), set off southward through the interior with his digging stick, creating the southern lakes. Meanwhile his son Rakihouia sailed *Uruao* along the east coast, erecting eel weirs at the Canterbury rivermouths, an activity reflected in the ancient coastal name, Ka poupou a (the posts of) Rakihouia. Rakaihautu returned to the *Uruao* at Waihao, sailed north and dug his last lakes at Waihora (Ellesmere) and Wairewa – Te kete ika a (the fish baskets of) Rakaihautu, left his digging stick to form the hill Tuhiraki (pointing to the sky) and settled down to live nearby. His Waitaha people, including their relatives Te

Rapuwai, were the first inhabitants of the region. They were obliged to slay its native monsters, one of them the Pouakai, a huge predatory bird that lived on Tawera (Mt Torlesse), and it was during their occupancy that the population became large, the land was made open by fire, and the moa became extinct. To them, later Maori ascribed the numerous old shell middens and the charcoal drawings in rockshelters. The Waitaha occupation corresponds essentially to the moa-hunting or Archaic phase, in which there occurred substantial transformations of faunal diversity and landscape.

About the late 16th century, Ngati Mamoe from the eastern North Island began to settle in the South Island, attracted by its diversity of resources. To them are attributed the red drawings that often overlie those in black on the walls of Canterbury rockshelters. Around the beginning of the 18th century, the Ngai Tahu clans began to arrive. Following a battle in Marlborough, Ngai Tahu released a captive of Rangitane, a high-born Ngati Mamoe woman named Hinerongo. The Ngai Tahu chiefs took her back to her people in order to see for themselves the southern lands famous for their production of tikumu (mountain daisy, *Celmisia* spp.) leaves used in fine weaving, and taramea (the scented resin of speargrass, *Aciphylla* spp.). A period of migration ensued, during which Ngati Mamoe were largely suppressed and Ngai Tahu assumed control of most of the South Island. The 16th to 18th centuries constitute the late or Classic Maori phase.

In Canterbury there were Ngati Irakehu settled on Banks Peninsula by the turn of the 18th century, but the main Ngai Tahu migration was by the subtribe Ngai Tuhaitara, probably about 1730, under the chief Turakautahi, who extended a small Waitaha village into the stronghold of Kaiapoi Pa. A century later, Te Rauparaha brought his musket-armed Ngati Toa warriors south, destroying Ngai Tahu settlements from Kaikoura to Akaroa, including Kaiapoi Pa in 1831. Ngai Tahu fought back soon after, but European observations of their traditional activities, mostly in the 1840s, have to be seen against the massive disruption of settlement and subsistence patterns that they had sustained. In particular, the pre-1831 settlement on the North Canterbury plains and Banks Peninsula, with its relatively dense population and traditional agriculture, is essentially absent from observation.[1]

Early settlement

Fifty years ago Roger Duff took the Rakaihautu migration as the founding event of South Island prehistory and argued, from the first radiocarbon ages for the Wairau Bar archaeological site in Marlborough, that it dated to about 1,000 years ago.[2] Recently, radiocarbon ages on bones of the introduced Pacific rat, or kiore (*Rattus exulans*) of up to 1,750 years ago in the lower Waitaki Valley (Earthquakes Shelter 1) and 2,150 years ago (Predator Cave) in Nelson[3] have suggested much earlier discovery, if not extended colonisation. However, subsequent research has cast serious doubt upon the accuracy of the early rat-bone dates. Numerous tests of reproducibility, including on samples from those sites and others that produced unexpectedly early results, have failed to provide dates earlier than 700–1,000 years ago, and nearly all of the new dates are at the younger end of that range.[4] Independent investigations that dated rat-gnawed land-snail shells[5] and seeds from forest trees in stratigraphic sequences[6] have shown similarly that the oldest evidence of rats in the environment occurred in the early second millennium AD.

That conclusion is consistent, in Canterbury and elsewhere in New Zealand, with the radiocarbon dating of a prominent peak in charcoal abundance and vegetation change that is attributed to cultural burning,[7] and with ages on archaeological sites. With few exceptions, the lower age range of the latter begins about 1250–1300.[8] The exceptions are on materials and in stratigraphic circumstances where the samples were probably of natural subfossil origin. Additional analysis of Canterbury archaeological dates on charcoal shows that samples identified as having low inbuilt age (i.e. from short-lived shrubs or grasses) have a maximum age around 750 years ago, which calibrates to about 1270–1370. A date of first arrival in the mid-13th century is a reasonable estimate.[9]

Settlement pattern

Sixty-four moa-hunting sites have been recorded in Canterbury (Figure 1), but only 12 have been investigated archaeologically in modern times, and none of the large open sites, such as Redcliffs Flat, Wakanui and Rakaia Mouth, by commensurately extensive excavations. The sites vary in size,

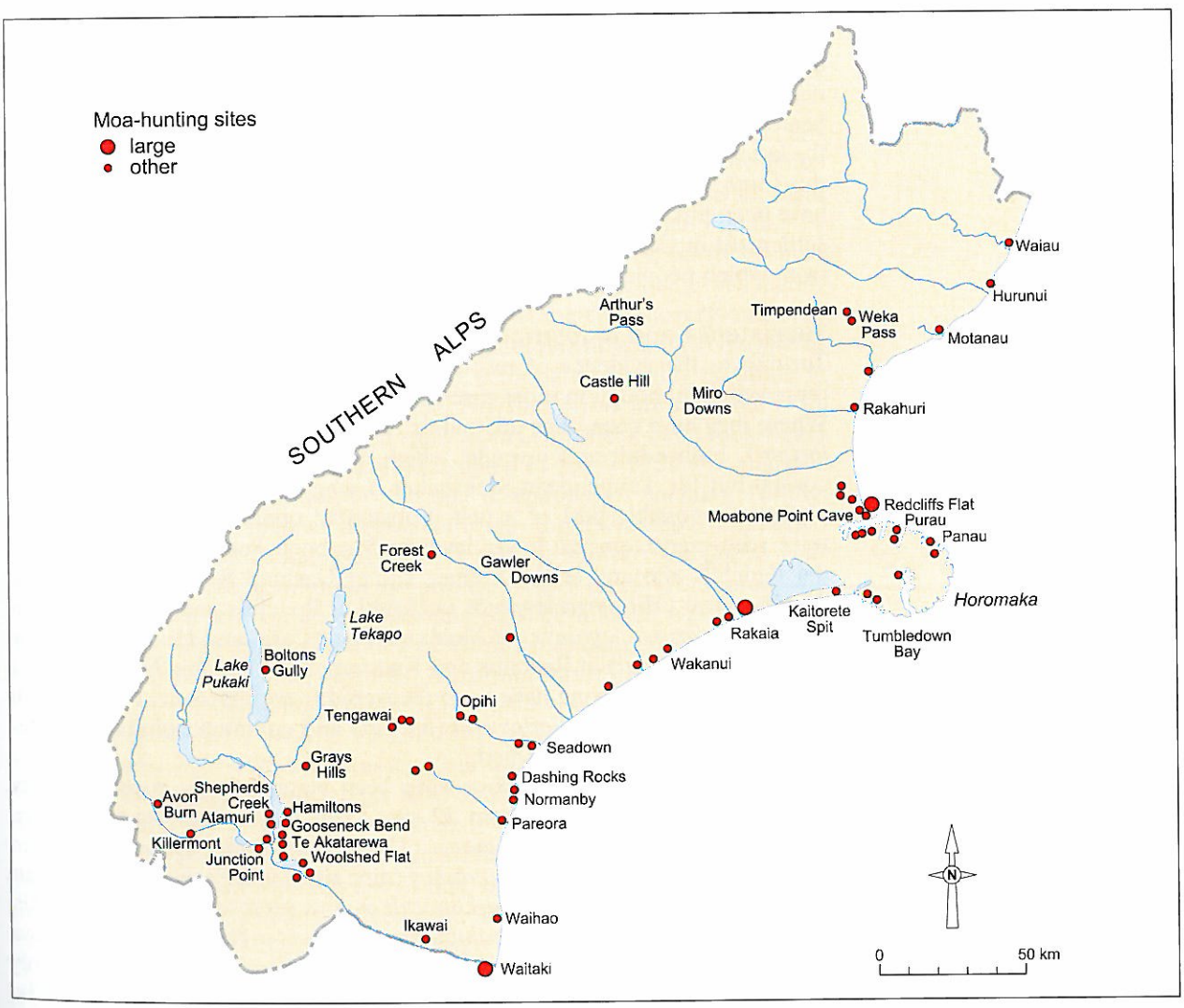

FIG. 1 Distribution of moa-hunting sites in Canterbury.
AFTER CHALLIS, 1995

from small moa-hunting or processing stations represented by single ovens up to the site at Rakaia Mouth, which is over 20 ha.[10] Faunal remains in most of them indicate a predominance of moa (80–100%[11]), and few functions other than those associated with moa, even at Rakaia Mouth. Evidence for dwellings, burials or domestic activities associated with moa hunting is scarce there, and the supposed remains of a large Archaic house[12] can be interpreted equally as those of storage structures.[13] The distribution of ovens at Rakaia Mouth and other large sites into groups of five to eight suggests that most of these sites were used temporarily by small groups, though in the larger sites repeatedly.[14]

In contrast, there are large sites around Banks Peninsula, especially on the north side, which have characteristics indicative of long-term occupation, notably Moabone Point Cave and the main Redcliffs site of about 4 ha. They contain 30–40%, by weight or number, of moa bone, but also about the same proportion of marine-mammal bone,[15] substantial quantities of small bird and fish bone, abundant shell midden and bones of the kuri, or domestic dog (*Canis familiaris*). In addition, there is evidence of deep stratigraphy, wooden structures and a cemetery. At Moncks Cave, a late Archaic site, the upper interior layer, possibly dated 15th century,[16] contained burnt and broken moa bone[17] and numerous pieces of domestic equipment, including nets, floats, sinkers, fish hooks and lines, an outrigger float and wooden beaters, probably for preparing bracken fern root (*Pteridium esculentum*); the latter were also found at Moabone Point Cave.[18] These data suggest that the south shore of the Avon-Heathcote Estuary, which at the time might have been linked to the Waimakariri River, was the prime location for early settlement in Canterbury and supported villages or year-round base camps from which people moved to seasonal or other temporary locations.

Subsistence and industrial resources

Turning to the evidence of resources in the Archaic phase, seals are well represented, although in most cases they have not been identified to species. Where they have been, they are mainly New Zealand fur seal (*Arctocephalus forsteri*), both adult and juvenile, which occurred in 10 sites, all of them coastal but for Timpendean rockshelter,[19] where there were a few fur seal phalanges, possibly part of a pelt. Substantial quantities of fur seal bone were recovered from the lower layer at Moabone Point Cave, throughout the Redcliffs site and at the Archaic site at Dashing Rocks, near Timaru. Elephant seal (*Mirounga leonina*) occurred at Redcliffs and Wakanui, leopard seal (*Hydrurga leptonyx*) at Moabone Point Cave, and Hooker's sea lion (*Phocarctos hookeri*) at Redcliffs and Kaitorete Spit. Dolphin bone and, to a lesser extent, whale bone have been recovered from numerous coastal sites; Hector's dolphin (*Cephalorhynchus hectori*) and common dolphin (*Delphinus delphis*) have been identified.[20]

Although no large collections have been systematically analysed, there are some data on moa taxa from 22 sites. These show that the most common species was *Euryapteryx gravis* (15 sites, including synonymised *Eu. geranoides*), followed by *Emeus crassus* (nine sites) and *Pachyornis elephantopus* (seven sites). Taking all the *Dinornis* as now representing *D. robustus*,[21] it was present in five sites, *Anomalopteryx didiformis* in four and *Megalapteryx didinus* in three.[22] As expected, *M. didinus*, an upland species, occurs only in inland sites, and *P. elephantopus* is also mainly inland (five sites). The

humid forest species *D. robustus* and *A. didiformis* occur, with one exception (Rakaia Mouth), in sites close to forested hill country (Waihao in South Canterbury, Redcliffs, Moabone Point Cave, and Tumbledown Bay around Banks Peninsula). *Eu. gravis* and *E. crassus* occur in sites along the coast and through the interior.

The other extinct birds associated with moa are scarce archaeologically[23] and occur only in the larger bone collections. These came from Rakaia Mouth (New Zealand goose, *Cnemiornis calcitrans*; Finsch's duck, *Chenonetta finschi*) and sites around Banks Peninsula: Redcliffs (black swan, *Cygnus atratus*; adzebill, *Aptornis defossor*), Moabone Point Cave (black swan; adzebill; Haast's eagle, *Hieraaetus moorei*), Moncks Cave (black swan), and Tumbledown Bay (adzebill, goose). There was also black swan, but no midden moa bone, at Takamatua,[24] and a possible crow (*Corvus moriorium*) from an Archaic context at Panau.[25]

Extant or recently extinct birds are widely represented in Archaic sites. The most common species were New Zealand quail (*Coturnix novaezelandiae*, nine sites), spotted shag (*Stictocarbo punctatus*, eight sites) and weka (*Gallirallus australis*, seven sites); with kaka (*Nestor meridionalis*), paradise shelduck (*Tadorna variegata*) and tui (*Prosthemadera novaeseelandiae*) in six sites; kiwi (*Apteryx* spp.), blue penguin (*Eudyptula minor*), grey duck (*Anas superciliosa*) and black shag (*Phalacrocorax carbo*) in five sites.[26] There is a general congruence between location and species: at the Redcliffs site, spotted shag and blue and crested penguin (*Eudyptes pachyrhynchus*) bones were particularly common,[27] whereas at Timpendean shelter, near Weka Pass, the most abundant bird bone was from New Zealand quail.[28]

There are few data for fish or shellfish in Archaic sites, partly because these resources were relatively lightly exploited while large game was readily available, but more particularly because archaeological recovery and analytical methods have been inadequate until quite recently. Ling (*Genypterus blacodes*), hapuku (*Polyprion oxygeneios*) – the latter notably common at Moabone Point Cave – and barracouta (*Thyrsites atun*) are reported from coastal sites, plus some eel (*Anguilla* spp.) from Gooseneck Bend rockshelter in the Waitaki Gorge. At Panau, a midden dated to 1327–1428 was analysed carefully and found to contain 36 red cod (*Pseudophycis bachus*), 10 ling, five barracouta, three snapper (*Pagrus auratus*), three wrasses (*Notolabrus*) and one or two each of kahawai (*Arripis trutta*), spotty (*Notolabrus celidotus*), elephant fish (*Callorhinchus milii*), Maori chief (*Paranotothenia augusta*), hapuku and Congridae. Associated shell midden was 90% paua (*Haliotis iris*), with small quantities of *Turbo smaragdus*, *Cookia sulcata*, *Amphibola crenata*, *Paphies australis*, *Haustrum haustorium*, *Cellana* spp., *Mytilus edulis*, *Melagraphia aethiops*, *Cominella* spp., and a possible valve of freshwater mussel, *Hyridella menziesi*.[29] Paua shell, probably used mainly for containers, and freshwater mussel occur quite commonly in inland rockshelters, and a range of soft- and hard-shore taxa comparable to that at Panau has been reported for coastal Archaic sites.[30]

Remains of plants seldom survive in archaeological sites, but net and line fragments indicate the Archaic use of flax, or harakeke (*Phormium tenax*), and wooden beaters, the use of fern root. The roots and stems of cabbage tree, or ti kouka (*Cordyline australis*), were another major source of food. Ti-cooking ovens are concentrated in the downlands of South Canterbury (Figure 2). Fifty-five have been recorded, but they are more abundant

than that and many of the raised-rim pits found along the western edge of the plains[31] and in the hills of Banks Peninsula and North Canterbury were very probably used to cook ti. Radiocarbon dating of ti ovens in South Canterbury (Figure 3) shows that many were used in the 13th and 14th centuries, doubtless providing the carbohydrate balance to a diet otherwise rich in fat and protein.[32] Two forms of wide-bladed greywacke adzes that are largely confined to the South Canterbury downs and coastal plains may have been used to dig up fern and ti roots.[33] It can be assumed that during the Archaic phase many other plant resources were used, although no specific remains have been reported. These would have included timbers, bark, vines, fibres and resins in construction; inner bark beaten into cloth and woven grasses in clothing; and berries, kernels and tubers as food.

Various stone types were exploited by Archaic foragers. At Rakaia Mouth, in addition to metasomatised argillite adzes from Nelson–Marlborough, and obsidian from the northern North Island, silcrete or quartzite, flint, silicified tuff ('palla') and greywacke were common materials in tools. Greywacke, ubiquitous as cobbles, was used for oven stones and also spalled into cutters

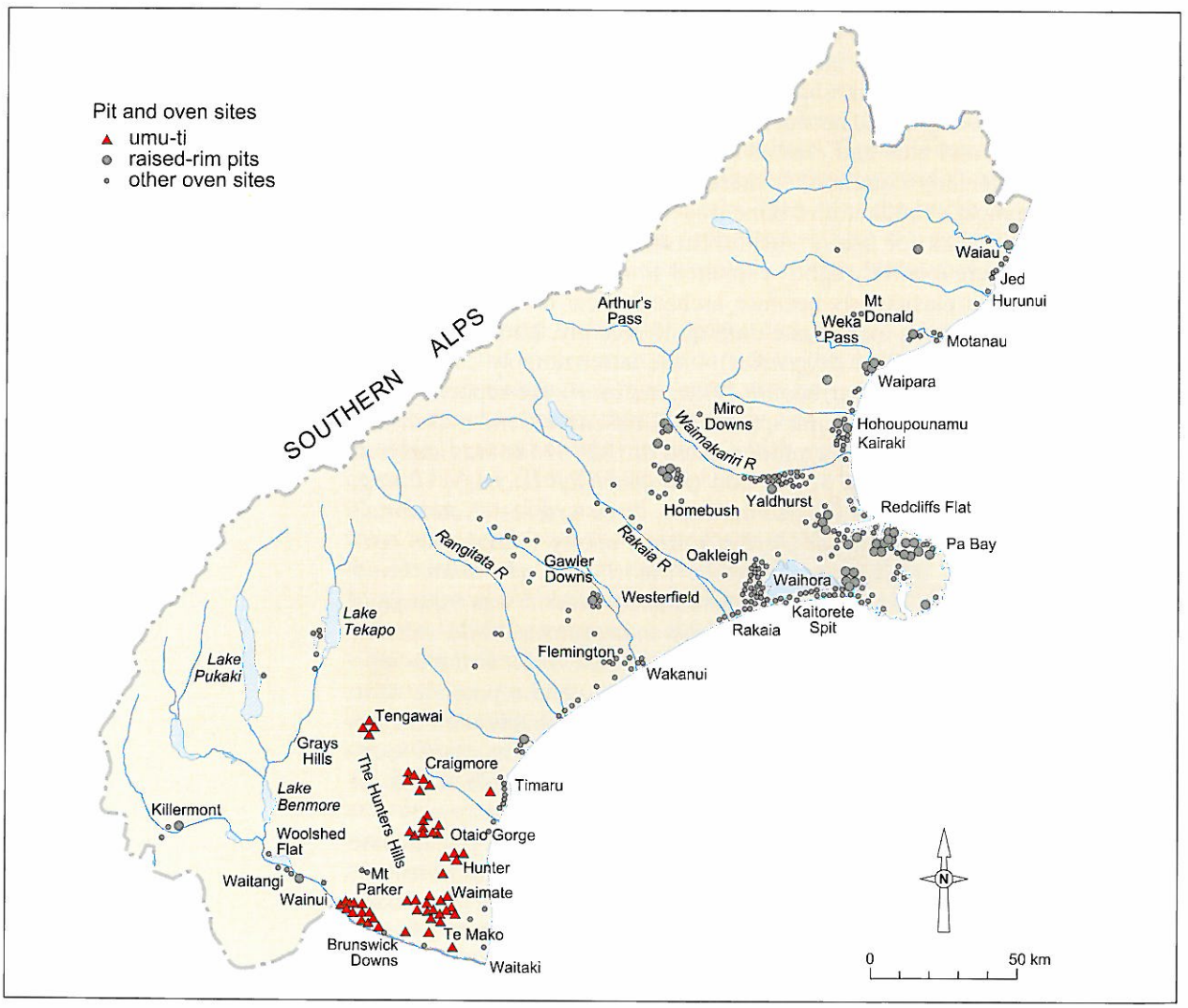

FIG. 2 Distribution of pit and oven sites in Canterbury.
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FIG. 3 Ti-cooking pits in South Canterbury.

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('teshoa') and fashioned into adzes and flax-beaters. Silicified tuff occurs in the upper Ashburton Valley, notably of a distinctive green colour at Gawler Downs, near Mt Somers. It was used to make adzes and other artefacts found in Archaic sites of central and South Canterbury. Silcrete, a bonded sandstone, was the preferred material for large butchery knives and cleavers. It was quarried extensively at Grays Hills, in the Mackenzie Country and there were smaller sources in the Waitaki Valley and at least one at Miro Downs, in the upper Waimakariri Valley.

Among other stone sources exploited in Canterbury were sandstone from Charteris Bay, a volcanic flint from Panau, and pitchstone, a low-quality volcanic glass, from near Gebbies Pass. Red argillite, sought for minnow lures and ornaments, agates used as hammerstones, schist for cutters, and various forms of chert, jasper and chalcedony, were picked out of riverbeds in Canterbury as they were elsewhere in the eastern South Island. Basalt was used commonly for making adzes. It was quarried and flaked in several localities around the southern slopes of Banks Peninsula.[34] Pounamu (nephrite, greenstone) from inland Otago or the West Coast was used in small quantities during the early phase.

Overall, early settlement was focused strongly upon the larger game resources of the coast and hinterland – moa and marine mammals. Most of the sites appear to have functioned mainly as processing stations, but around Banks Peninsula, and in a few other areas such as between Timaru and Pareora, there were substantial Archaic sites. At the mouths of the North Canterbury rivers (Waipara, Hurunui, Waiau), where the diversity of resources was notably higher than along the common sand and gravel shores of the province, there may have been other long-term settlements.[35]

Environmental transformation

Substantial changes occurred in the landscape between the 14th and 16th centuries. People were certainly involved in creating them, but perhaps not entirely. Within unusually high-frequency ENSO (El Niño–

Southern Oscillation) events during the last few millennia, there was a peak of intensity 1200–1400,[36] which may have accelerated the rate or impact of burning in Canterbury forests. At any rate, the fire-return interval dropped from about 50 years at 1000 BC to only seven years between 750 and 500 years ago, as the lowland conifer/broad-leaved forests of the plains were substantially destroyed[37] and sedimentary regimes invigorated.[38] The landscape of the plains was transformed into extensive grasslands dotted with shrubs, fern and clumps of cabbage trees, and crossed by flax-bordered streams. Forest remained on Banks Peninsula and in a few other places, and beech forest quite extensively in the eastern alps, but the Canterbury landscape was largely changed in ways inimical to the survival of large or otherwise vulnerable birds.

The New Zealand eagle and large harrier (*Circus teauteensis*), adzebill, goose, swan, Finsch's duck, pink-eared duck (*Malacorhynchus scarletti*) and other smaller birds disappeared, although for many of them there are not yet sufficiently precise details from Canterbury sites of the past 500 years to tell which species went extinct in the Archaic phase or at some later time prior to European observation. The breeding range, marked by adult female and pup bone in archaeological sites, of the New Zealand fur seal, and probably also of the sea lion, retreated under predation from the Northland coast at 1300, to Cook Strait by about 1500 and to East Otago by 1800.[39]

The extinction of moa is a topic still not fully understood, but human predation and habitat alteration are strongly implicated. In the absence of extensive excavation of moa-hunting sites, levels of harvest are rather conjectural, but there is little reason to doubt that thousands of birds were processed at sites like Rakaia Mouth where there were a thousand or so ovens apparent in the late 19th century, and those investigated showed up to five episodes of use.[40] How devastating that might have been depends upon estimates of moa population density, which, recently, have tended to be relatively low[41] compared with those that took ungulates as a model.[42] Given the vulnerability of a low breeding rate in moa, and relatively rapid natural increase of more than 2% per annum in the human population, then moa decline to extinction by quite modest levels of predation can be modelled as occurring in 100–150 years. If widespread deleterious habitat change is also taken into account, then this could fall to as brief as 50 years.[43] The archaeological data certainly indicate that moa declined rapidly as a major resource, but the difference between substantial population decline and extinction might still have been considerable. As pointed out by critics of the Holdaway and Jacomb model, in which predation is theoretically independent of prey density, the more realistic assumption would be that predation pressure declined with yield, so that an initial sharp drop in density was followed by a slow decline to extinction.[44]

Persistent occurrence of moa into the 15th century or later seems to be reflected in radiocarbon dates on moa-hunting sites[45] and moa-bone collagen.[46] Moa probably survived longest in forested hill country, including on Banks Peninsula. Tumbledown Bay, the only Canterbury site from the transitional era for which there exist much data, is a case in point. It was occupied first (layer 3) about the late 15th century. In layer 3, in addition to remains of adzebill and goose, there were moa bones, including tracheal rings and vertebrae, from four species (*E. crassus*, *Eu. gravis*, *A. didiformis*, *D. robustus*). Radiocarbon dates from various sample types in layer 3 are

consistently late: NZA-338 (307 ± 85 BP) on moa-bone collagen calibrates to AD 1454–1954; c.f. AD 1447–1635 (NZ-7656) on twig charcoal, and AD 1490–1670 (NZ-7654), AD 1519–1671 (NZ-7745) on marine shell.[47] There is a result of similar age and agreement between shell and moa-bone collagen dates for the North Otago site at Ototara,[48] where *Eu. gravis*, goose and black swan were recorded.[49] It is probable, therefore, that moa and some other large birds survived at low densities in Canterbury up to the late 15th century, even later.

If the loss of big-game diversity in birds and of access to seals were severe disadvantages, deforestation was at least not to the same extent. The landscape had certainly become open, but it was not denuded of woody plants, even by the 19th century when Walter Mantell described it: 'Wood though generally distant is nowhere out of reach while grass with frequent groves of ti covers the plain in every direction.'[50] High-quality bracken fern growing in damper areas around the eastern plains and a substantial increase in *Cordyline* habitat, not to mention of tutu (*Coriaria arborea*) and other berry-yielding shrubs, offered some compensation for the loss of forest. Open ground suited weka and quail, and enhanced light and nutrient levels increased production of birds and eels and other fish in waterways, especially in the rich coastal lagoons (hapua). Nevertheless, lowered readily accessible biomass of avifauna and the loss of important clumped resources such as seal colonies (and possibly moa-nesting areas) required greater mobility in the subsistence pursuit, a point emphasised by the discovery of a 15th–17th-century framed backpack at Flock Hill. The pack frame was of timber from *Phyllocladus* spp. and *Nothofagus* spp., and the bag was made from woven flax. Inside it were two unfinished paua-shell pendants, tibial bone from two dogs and a great spotted kiwi (*Apteryx haastii*), a coil of unidentified plant fibre and some pieces of woven flax. Caught up in the fabric of the pack were feathers from weka, kakapo (*Strigops habroptilus*) and kaka, suggesting that it had been used to carry these at some time.[51]

Late settlement

There are few archaeological data concerning late subsistence patterns in Canterbury. Fishing was becoming more prominent as a subsistence activity throughout the prehistoric era, as is evident in a relative increase in fish bones at Moabone Point Cave from 3% to 39% of bones between the lower and upper layer, but there are too few quantitative data from Canterbury to specify exploitation patterns more precisely, especially in late prehistory. Evidence of fishing from late-period southern South Island middens generally shows that barracouta occur at 58% and red cod at 25%. The next most frequent is hapuku at 5%.[52] These data are likely to approximate the situation in Canterbury, and are possibly foreshadowed in the layer 3 Tumbledown Bay data: 31 barracouta, three red cod, three elasmobranchs (sharks, rays, etc.), two ling and two hapuku.[53] Otherwise, the common identification of barracouta on Canterbury pa sites is consistent, even if it mainly reflects the simple recognition of distinctive barracouta jaw bones. Numerous shell middens on beach ridges between the Waimakariri and Ashley Rivers are probably of late origin, especially those located near Kaiapoi Pa, some of which contain numerous pieces of pounamu, as at Hohoupounamu. Pipi (*Paphies australis*), cockle (*Austrovenus stutchburyi*) and mud snail (*Amphibola crenata*) make up 97% of the identified shell.[54]

Traditional resources and their procurement

By the mid-19th century, Canterbury Maori subsistence activities had been described briefly by Europeans, as for example by Tancred:

> They seem to have had recourse chiefly to the fish which they managed to catch in estuaries by means of stake-nets . . . They could also secure, by spearing them or catching them in springes [snares], wood-pigeons, parrots, the woodhen, the apteryx and other birds . . . for vegetables, they eat the fern root peeled and beaten, also the pith from the heart of the Ti-palm . . . Eels are caught in great numbers by means of eel-pots . . . they are dried and preserved for winter stock. Large maggots [huhu grubs] found in trees are considered a delicacy by the natives.[55]

To tease out more of the full diversity of Maori resource use, and then to understand the organisational structures in which resources were managed, it is necessary to survey the ethnographical and historical evidence.

In preparation for an enquiry into land claims in 1880, Ngai Tahu elders mapped and named 1,400 places in Canterbury and North Otago where they had customarily gathered resources, listing the types at each place.[56] The density distribution of these places, known as wahi or kainga mahinga kai (places or settlements for making food), or kainga nohoanga (settlements of specific ownership), varied from one camp per 9–15 km^2 in South Canterbury to one per 24 km^2 in the upper Waimakariri. At 15 camps per km^2, there would have been about 3,000 in all of Canterbury below the alpine areas, although not all would have been used in any one year.[57]

Among 62 resources, eels, fern root and ti were most frequently listed, along with a group of small riverine or estuarine fish: waharoa, pipiki, patete, paraki (probably names for smelt: *Retropinna retropinna*, *Stokellia anisodon*); panako (*Galaxias* spp.), grayling (*Prototroctes oxyrhynchus*), whitebait (*Galaxias* spp.) and kokopu and koukoupara (adult native trout, Galaxiidae). Tutu, raupo (*Typha orientalis*) root and pollen and flax honey were important plant foods, and weka, tui and rat were also prominent. The most common type of wahi mahinga kai recorded in the lists was a stretch of watercourse where eels and other fish were procured, ducks caught and fern root or ti obtained. Next in frequency were sea-fishing localities and then fowling camps, notably for weka. In South Canterbury the emphasis was on eels, small riverine and estuarine fish, ti and fern root, while in the upper Waimakariri it was on birds, especially weka, and the kiore.[58]

Additional information about traditional food, collected by Herries Beattie, shows that 105 food resources were recalled in 1920 (see opposite). As his data were obtained mainly in South Canterbury, where coastal fishing and fowling were much less prominent than around Banks Peninsula, there were some gaps in the coverage, notably of reef fish such as blue cod (*Parapercis colias*), red cod, moki (*Latridopsis ciliaris*), butterfish (*Odax pullus*) and the wrasses (*Pseudolabrus* spp.), and also of coastal birds, especially procellariids. Nevertheless, the historical sources disclose something of the diversity of traditional resource foraging.

Marine and freshwater resources

Beached whale carcasses were exploited for food, bone and ivory, and dolphins were harpooned with traditional weapons up to the 1840s, but the New Zealand fur seal had been reduced to a rare sighting. The Ngai Tahu sea fishery concentrated upon barracouta, which arrive in huge shoals

Food sources mentioned in Herries Beattie's Canterbury records

FOOD PLANTS

Maori name	European name	Food type
tutu	*Coriaria* sp.	berries
matai	black pine	berries
kareao	supplejack	berries
kotukutuku	fuchsia	berries
makomako	wineberry	berries
mikimiki	mingimingi	berries
taupuku	snowberry	berries
poroporo	bulli-bulli	berries
kahika	white pine	berries
totara	red pine	berries
hinau	*Elaeocarpus* sp.	berries
rohutu	myrtle	berries
karaka	*Corynocarpus* sp.	berries
titoki	*Alectryon* sp.	berries
pora	wild cabbage	leaves
kawakawa	wild turnip	leaves
papaii	speargrass	stem
pitau	raupo stem	shoots
purau	purau grass	root
koareare	raupo root	root
pukapuka	raupo flower	pollen
kauheke	ribbonweed	inner bark
aruhe	bracken fern	root
korari	flax flower	honey
tutuna		root
pohue	bindweed	roots
kauru	cabbage tree	stem, root
nikau	nikau palm	heart
titoi		root, stem
kaleko	karengo	leaves
rimurimu	carrageen	leaves
rimupuka	kelp	stem
parumoana	seaweed	?
poletara	puffball	all
weho	tree fungus	all
harore	fungus	all
kuta	?watercress	leaves

SEA FISH

Maori name	European name
maka	barracouta
hapuku	groper
kahawai	*Arripis* sp.
tarakihi	*Nemadactylus* sp.
koekohe	trumpeter
whai	ray/skate
rari	ling
koiro	conger eel
puhaiwhakarua	soldier fish
patiki	flounder
raututu	yellowbelly flounder
horihori	sole
karaerae	shark
tutahuna	shark
huarau	spiny dogfish
ururoa	shark
kaupane	shark
tatare	shark
repe	elephant fish
tuere	hagfish
wheke	octopus

RIVER AND ESTUARY FISH

Maori name	European name
paraki	smelt
marakuha	?sprat
koroamo	?sprat
waharoa	?sprat
patete	?sprat
aua	herring
inaka	minnow
puataata	silvery
mohoao	black flounder
upokororo	grayling
panako	*Galaxias* spp.
kokobala	*Galaxias* spp.
kokopula	*Galaxias* spp.
pipiki	*Galaxias* spp.
mata	whitebait
kanakana	lamprey
hao	eel
horepara	silver eel
mairehe	black eel
tuna	eel

OTHER

Maori name	European name
kuri	dog
kiore	rat
pakake	seal
tukarakau	huhu grub

FOOD BIRDS

Maori name	European name
kotuku	white heron
kakapo	ground parrot
kiwi	*Apteryx* spp.
koau	shags
korora	little blue penguin
karoio	black-belly gull
tarapuke	small gull
kaka	brown parrot
kereru	pigeon
tui	parson bird
kakariki	parakeets
makomako	bellbird
pioioi	ground lark
koreke	native quail
tokokipio	dabchick
pakura	swamphen
putakitaki	paradise duck
panera	grey duck
weka	woodhen
kakaruai	robin
tatariki	native canary
toroa	albatross
titi	sooty shearwater

Source: Beattie, J. H., 1994: *Traditional Lifeways of the Southern Maori*, Atholl Anderson (ed.), Otago University Press, Dunedin.

in the Canterbury Bight in the early summer, to feed voraciously on small pelagic fish, often attracting gulls. The regularity of migration and the visibility of the shoals created a reliable and rich fishery for Ngai Tahu between November and April each year. Barracouta and other pelagic species were caught by the highly efficient barracouta lure thrashed on the water in a school of feeding fish.[59]

Other important fishing activities included catching dogfish and other small elasmobranchs during the summer in the bays of Banks Peninsula. Flounder (*Rhombosolea* spp.) provided an important autumn–winter catch in coastal lagoons and harbours. At sea, the main fishing methods involved the use of multiple hooks on spreaders to catch the smaller species, and large wooden-shanked hooks for hapuku and sharks. Spears and seine nets were used in harbours and bays, and nets up to about 160 m long were deployed at rivermouths by canoe or mokihi. Shellfishing for mussels, cockles, pipi, paua and other taxa was a very common activity that provided the most reliable seafood (kai moana).

Eels (tuna) were rivalled only by barracouta as a major food source. They could be taken by any of a variety of methods, including spearing, guddling and the use of basket traps (hinaki). Ngai Tahu would set out to walk almost anywhere without carrying food, confident of their ability to produce eels from any waterway. There was also systematic eeling on a large scale in Canterbury, which took advantage of the migratory cycle. Eels moved downstream in the spring and early summer, often with the spring rains, and were captured by hinaki set in fences (pa tuna) constructed across streams and rivers. During late summer and early autumn, eels congregated in hapua along the Canterbury coast, where they were caught in large numbers by the awa or koumu method (Figure 4). Trenches, each about 60 m long and some metres apart, were cut in parallel lines through gravel bars blocking the lagoons, and eels, seeking a way out to sea, were trapped or speared, generally at night. Waihora and Wairewa were the main fisheries of this type. Trenches were individually owned and could yield hundreds of eels, sometimes thousands, during a night's fishing. Once the eels began to ascend the rivers again in early winter, the pa tuna were put back into

FIG. 4 The koumu method of eeling, Wairewa, 1948.

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