

DESTRUCTION OF THE INDIGENOUS FORESTS FOR MAORI AGRICULTURE DURING THE NINE- TEENTH CENTURY

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"God has given them a beautiful country and refreshed (not often deluged) by rains, beyond any country perhaps in the world. Even in winter, it is not often more than two days that the clouds do not break away; . . ."

THOMAS CHAPMAN.

SYNOPSIS

The introduction of the potato to New Zealand at the end of the eighteenth century caused considerable changes in Maori agriculture. There was a great expansion in shifting cultivation over forest land and there are records of Maori fires having destroyed very large areas of forest. It is suggested that European settlement did not accelerate the rate of forest destruction but merely continued it on the same scale.

INTRODUCTION

New Zealand is a country with forest climates, but today the forests which once covered most of the land surface have diminished and do not even protect adequately the large areas of unstable mountain country that form such a conspicuous part of our landscape.

Destruction of the forests began with the first Polynesian migrants, perhaps a thousand years ago, who either caused or hastened the removal of the forest from the drier eastern plains and hills of both islands (Holloway, 1954). Later fires maintained these areas as grassland and, in exceptionally dry periods, destroyed still further areas of forest, particularly in eastern districts of the North Island and beech forests east of the Southern Alps. Elsewhere, as Maori populations increased and spread, clearings were made in the forest for village sites and cultivation and, along regularly used tracks, the persistent efforts of the Maori to burn the forest were often effective (see later).

Towards the end of the eighteenth century, the Maori population was between 100,000 (according to Captain Cook, *vide* Reed, 1951) and 500,000 (Buck, 1950). These were a tribal people with clear, if not always secure, territorial ownerships and a well developed system of agriculture (Best, 1925). It is generally accepted that at this time about one-half of the land area remained in forest.

Arrival of the European settlers is believed to have greatly accelerated the rate of forest destruction, this continuing throughout the nineteenth and into the first half of the twentieth century. Today less than 15 million acres remains, most of this being non-merchantable forest on steep, mountainous country.

This, briefly, is the commonly accepted history of forest destruction in New Zealand: a primaeval period with forest covering most

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of the country followed by a thousand years, more or less, of occupation by a stone-age people, during which time perhaps half the forest cover was removed, and then just over a hundred years of European influence during which nearly half the residual area was destroyed.

The accuracy of this account is open to serious doubt, for it now seems probable that for a period of some seventy to ninety years, during the last decades of the eighteenth century and the first sixty or so years of the nineteenth century, the Maori people underwent an agricultural revolution. This was caused by the introduction of the potato, which not only resulted in a return to ancient methods of crop cultivation, but also, because of the demand of visiting ships for food and the consequent value of potatoes as an item of trade, greatly encouraged agricultural expansion, particularly in northern districts. Most of the early missionaries and travellers who left written records commented upon both the extent to which potatoes were cultivated and, of more consequence, the manner in which the Maori were laying waste tremendous areas of forest. The European settlers probably only continued to destroy lowland forest on the same scale as Maori agriculturists of the previous half century. There was, however, one very important difference between the Maori and the European farmer, in that the latter wanted individual title to his land and strove to practise permanent agriculture.

A previous paper (Cameron, 1961) gives a general historical account of the impact of the Maori upon the forests of New Zealand, making reference to the great change that took place in Maori agriculture consequent upon the introduction of the potato. The present paper provides evidence that this change occurred and discusses the effect it had upon the indigenous forests.

THE INTRODUCTION OF THE POTATO

The exact date when potatoes were introduced to New Zealand is not known. In 1769 De Surville (Best, 1925) gave seed of peas, wheat, and rice to the natives but there is no evidence of potatoes being introduced at this time. In 1772 Crozet, under Marion du Fresne, made a plantation at Motuaro in the Bay of Islands of wheat, maize, potatoes, and various nuts and fruits (Best), and in 1773 Captain Cook, on his second voyage to New Zealand, made several cultivations at Queen Charlotte Sound (Reed). Here he planted root vegetables including potatoes, turnips, carrots, onions, leeks, and radishes, and a number of other food plants including peas, beans, cabbages, corn, and parsley.

There is no way of finding out how successful these introductions of the potato were but Best considered it quite probable that one or other succeeded.

The Rev. Samuel Marsden, visiting New Zealand in 1813, commented upon the extent to which potatoes were cultivated and gave his opinion that potatoes were probably introduced without record by one or more of a number of ships visiting New Zealand during the 1790s (J. R. Elder, 1932). He also stated that officially

introduction was credited to Lt. King, Governor of Norfolk Island, who visited the far north of New Zealand in 1793 and gave the natives various seeds and garden implements. King's own journals, according to Best, itemize the quantities of seed of maize, wheat, peas, etc., but do not mention potatoes at all.

By 1801 there were extensive areas of potato gardens in the Thames district and by 1803 potatoes could be bought there in quantity (Marsden). In 1805 Dr. Savage, at the Bay of Islands, purchased a sufficient quantity of good-quality potatoes to supply his ship for several months (Best), and described the general practice of the natives, of bartering potatoes for axes and other iron tools. Williams, a flax dresser, recorded having seen at Bluff in 1813 a potato field more than 100 acres in extent (Best). These observations support the belief that either Cook or du Fresne, or both, successfully introduced potatoes.

PRE-EUROPEAN MAORI AGRICULTURE

Tropical Food Plants of the Maori, and New Zealand Regions

The cultivated food plants of the old Maori were all of tropical origin. The most important were the kumara (*Ipomoea batatas*), taro (*Colocasia antiquorum*), yam (*Dioscoria* spp.), and gourds (*Lagenaria vulgaris*). All of these had to be cultivated with special care; only the kumara gave reasonably large yields, but even it gave no certainty of good crops. The high sugar content of the kumara root made it difficult to store and, in most areas, for several months of each year, such inferior foods as fern roots (rhizomes of *Pteridium aquilinum* var. *esculentum*), the starchy pith of mamaku fronds (*Cyathea medullaris*), and the sugary pith of the tap root of various species of *Cordyline* had to be used; in fact, in some inland districts, these formed the staple diet (Best, Brunner, 1952).

Best identifies for the Maori four habitats, depending upon the ease with which the Polynesian vegetables could be grown:

1. Northern areas, and alluvial and volcanic soils of warm districts where good crops could be grown; densely populated.
2. Soils of medium quality, or fertile soils occurring only in small areas; scattered populations, more reliant upon uncultivated foodstuffs.
3. Sterile soils or elevated areas climatically unsuitable for cultivation; sparsely populated with people to whom cultivated foods were a luxury, forming an unimportant part of their food supplies.
4. Sterile soils, high altitudes, and severe climates, cultivation impossible; unpopulated, or only small, insecure communities.

The pre-European Maori population map given in McLintock's Atlas (1959) supports this concept, 82% of the population occupying Northland, Auckland, Bay of Plenty, and coastal districts of Taranaki and the East Coast, 15% occupying central districts, Wellington, coastal Nelson, Marlborough, and North Canterbury, and only 3% being scattered through the remainder of the South Island, Stewart Island, and the Chatham Islands.

Adaptation of Polynesian Methods of Agriculture to New Zealand Conditions

The old Polynesians used shifting cultivation to grow tropical food plants on the fertile volcanic soils of Polynesia (N. H. Taylor, 1958). Arrived in New Zealand, the Maori had to adjust his agricultural methods to temperate climates and, in most places, to less fertile soils. At first he must have relied upon shifting cultivation on forest soils but later, in many areas, mainly on alluvial soils, he managed to find various ways of maintaining soil fertility. Thus was gradually developed a system of soil management somewhat more advanced than the traditional methods of old Polynesia.

In some areas, at least, permanent cultivations were maintained: dressings of sand or gravel were applied to maintain suitable soil conditions, and of ashes to restore fertility; drains were dug, boulders cleared away, windbreaks constructed, and topography occasionally altered by terracing; from time to time sections of the cultivated areas were allowed to lie fallow for a period (Best, Wilson). In other areas land would be cropped for two or three years and then allowed to fallow for 10 years or more, giving a more or less regular alternation of cultivated crops with fern or scrub. To quote N. H. Taylor, "Almost, the Maori people were touching upon crop rotation".

Best has given exhaustive descriptions of the elaborate ritual and ceremony with which land was cleared and prepared, and crops planted, tended, harvested, and stored, while many of the early travellers (Chapman, 1831; Johnson, 1847; Selwyn) comment upon the neat, well ordered cultivations to be found adjoining the permanent villages. At Ohinemutu, Rotorua, in 1847, Johnson commented upon the hill above the village:

. . . covered with a rich volcanic clay, on which were planted large fields of kumara, neatly fenced, and tended with all the care that the natives generally bestow on that root. . . .

INFLUENCE OF THE POTATO ON MAORI AGRICULTURE

Maori Acceptance of the Potato as a Food Plant

Of the plants commonly cultivated by the Maori in pre-European times, the kumara was propagated by tubers, the taro by side shoots, and the yam by both methods; only gourds were grown from seed. It could be expected, therefore, that little interest would be shown at first in such novel plants as peas, beans, or wheat, but that cultivation of the potato, a more familiar type of plant, would be more readily commenced. This step taken, the advantages of the potato over the kumara, both in ease of cultivation and in productivity, would soon become apparent.

For the first time the Maori was provided with a food plant that could be grown on any moderately fertile soil. Crops could be obtained earlier and more reliably, even in high-lying or cold districts, while in warmer areas more than one crop could be grown each year. Potatoes could be grown successfully with less labour, and harvested crops stored with much less difficulty than

could kumara. The potato was the most useful and most welcome of all the introduced food plants, filling a long felt want, and its culture spread rapidly from coastal to inland tribes, probably displacing kumara cultivation to a considerable extent. Best wrote:

Where formerly, these folk [those of high-lying districts] lived almost entirely on wild products: roots, berries, eels, and birds, they could now rely principally on the potato crop. Where the forests had formerly been strictly conserved as providing an important part of the tribal food supply, they now became quite a secondary consideration. . . .

Methods of Potato Cultivation

Several writers between 1800 and 1860 described the methods the Maori used to grow potatoes. Most of these observed that early potatoes were planted only on freshly cleared ground. For example, in 1835 the Rev. W. Yates (quoted by Best) wrote:

. . . the winter potato is always planted in new ground, upon which nothing has ever before been planted. This ground is chosen on the side of a wood; the trees are burnt down, the branches consumed, and the potatoes placed between the roots, or upon any little bare spot that may be found. They tell us that the reason for choosing such spots for these potatoes is that the earth is all rotten leaves and branches of trees and shrubs; the only soil in which the vegetable will flourish . . .

and in 1847 Johnson, passing near Tuakau, observed:

. . . families of natives . . . were preparing the ground for the autumnal or spring crop of potatoes, by their usual destructive mode of burning the wood . . . the fires, favoured by the dryness of the season, which rendered the underwood inflammable, eating their way upwards, and consuming hundreds of noble trees, far beyond the cultivations . . .

Other writers drew no distinction between early and main-crop potatoes, and Bidwill wrote:

. . . potatoes . . . are never planted by the natives but on newly cleared land which they abandon after the third year's crop; it then becomes covered with fern, and in a few more years is rendered fit for nothing by the constant fires destroying whatever vegetable matter is formed by the decaying plants . . .

It has been said (Best; N. L. Elder, 1956) that the Maori adapted kumara techniques to potato growing, but this is not strictly correct. The two vegetables require different soil conditions; kumara needs a warm, well aerated, free-draining soil of moderate fertility while potatoes grow well on cool, moist soils, but will not give good yields on the same soils, crop after crop, unless levels of available nitrogen, phosphate, and potassium remain high. Also, potatoes grow well on acid soils and can utilize nitrogen from decaying organic material. As the Maori had no idea of manuring the soil other than by scattering wood ashes (Walsh, 1902; Best) (regarding with complete disgust the missionaries' custom of spreading animal and human

excreta over their gardens (Chapman)), grown under kumara practice in permanent gardens potatoes would have given poor yields, decreased still further by disease. Thus, from very early on, a form of shifting cultivation over forest land was adopted—a rapacious form of agriculture, making greater inroads into the forest than had kumara cultivation. Land-clearing methods remained the same, but there the similarity to kumara cultivation ended. Faced with the problem of growing a new plant, the Maori returned to the agricultural methods of his ancestors; the age-old methods became the “new” agriculture of the Maori.

Extent of Potato Cultivation and Location of Gardens

Early in the nineteenth century potatoes became especially important to the Maori as a valuable item of trade. Dr Savage, at the Bay of Islands in 1805, recorded (Best):

Though the natives are exceedingly fond of this root they eat them but sparingly, on account of their great value in procuring iron by barter from European ships that touch at this part of the coast. The utility of this metal is found to be so great, that they would suffer almost any privation or inconvenience for the possession of it, particularly when wrought into axes, adzes or small hatchets: the potatoes are consequently preserved with the greatest care against the arrival of a vessel . . .

Markham, in 1834, described how: “Vessels come up the Hokianga and buy and salt all the Pork they can—also Potatoes at 12/- a ton and sold for £12. . . .” He also tells how, at that time, one hoe could be bartered for five kits of potatoes and a spade for 10 kits, a kit or basket being anything from 8 to 30 pounds.

Potato cultivation must have expanded very rapidly among the Maori, for as early as 1805 (see above) they formed a basis for trade and barter. At Hokianga in 1834 Markham saw a store of 4,000 bags of potatoes in one village (probably about 100 tons in all). The early missionaries had no difficulty in buying several tons at a time, the Rev. A. N. Brown recording having bought over 500 baskets of potatoes at Matamata in 1835. Johnson, travelling to Rotorua from Auckland in 1847, relied to a large extent upon locally produced potatoes for food, writing: “Potatoes are always to be procured at native settlements. . . .”

This agricultural expansion was carried out by a primitive people, with primitive tools and involved an enormous amount of co-ordinated labour. Today we tend to regard the Maori as a rather indolent, easy-going race. A hundred and fifty years ago the Maori were not only under the stress of an impending invasion by a more advanced culture, but were also organized under strict tribal discipline and were much more active communally than they have ever been in European times. The 1860s saw tribal organization at an end, the authority of the chief diminished, and agriculture on the wane. At this time the Maori were finding it difficult to sell their produce to the European settlers, who were becoming self-supporting for meat, vegetables, and other food.

It is interesting to note how the Maori scattered their gardens far and wide. Walsh (1902) recorded that powerful tribes with well fortified villages maintained open cultivations, often extensive, but that, more generally, many small plots were planted over a wide area and hidden in unlikely places to prevent the crop from being destroyed or stolen by raiding parties. Johnson, Selwyn, Hochstetter (1867), Dieffenbach (1843), Bidwill, and Chapman were but a few of the writers who commented upon this. Chapman wrote, in 1832:

. . . their summer potatoes (early potatoes) these are generally planted in different spots in different districts . . . as they may from circumstances be led to think most eligible—cultivating perhaps in part on the coast, and part in patches about more inland, as well as at those particular places which may be said to be their place of residence—so that from these and other causes they are kept restless and unsettled. During a large part of the year therefore the natives become scattered around in small parties—making mission work difficult . . .

Markham (1834) made similar observations when, two years later, he wrote:

They have their different stations and the New Zealanders have patches of cultivation in twenty places, and are here one season and there another, and at one time they like Fish and Pippies and at another Cormeras and Potatoes, one part of the Country is best for their Pork to thrive in, so they migrate from place to place . . .

Hochstetter, one of the most observant and perhaps the most scientifically accurate of the early explorers, stated that it was a general custom of the Maori to establish potato gardens in remote and inaccessible places, particularly in large forest areas. Other writers observed that cultivations were established at regular intervals along main tracks and that it was customary for travellers to take what they required.

Today, in many areas, soil scientists can demonstrate the soils once used for kumara cultivation, either as the specially constructed "Maori soils" described by N. H. Taylor or, in pumice areas, as soils with greater depth of humus and improved physical structure. However, it is unlikely that soils which were patch cropped for potatoes 100 to 150 years ago will show much direct evidence of ever having been used for agriculture; in most such areas subsequent fires will have helped to mask any changes that potato growing may have caused in the soil profile, and today it would be difficult, if not impossible, to map accurately their extent and location.

MAORI CULTIVATIONS AND FOREST DESTRUCTION

Chapman, writing in 1838, described the effects the Maori agronomists were having on the forest:

New Zealand . . . has tens of thousands and thousands of thousands of acres of land which the ravages of fires and axes have cleared of the wood that once densely covered them and these now matted with fern, present a barrier to extensive agricultural movement, full of labour and not abundant in return . . .

and, a few years later:

[The Maori] . . . are the lords of the soil (counties lying waste and desolate without inhabitants) but it is of no use to them . . . grubbing on and muddling their lives away, wandering from spot to spot — cultivating here and cultivating there and yet possessing literally nothing because nothing is improved and nothing established. A chief . . . will point to large tracts of once valuable timber land — now cleared, the timber burnt and wasted; the land valueless . . . the forests inexhaustible, if placed under proper regulation, now yearly devastated on all sides merely to grow potatoes . . .

Many of the early explorers commented upon the extent of the potato cultivations around Lake Taupo. Chapman attributed all the bare land around the lake to Maori fires, and Dieffenbach, in 1843, wrote:

It is evident that the forest has at some former period covered a greater extent of land in the neighbourhood of Taupo than it now does; it does not appear to have been destroyed by volcanic eruptions, but by the fires kindled by the natives in order to clear the ground for purposes of their cultivation . . .

Bidwill was rather more cautious and, travelling through the Taupo district in 1839, wrote:

The country around I do not think to be populous, and the Maoris only grow potatoes in land which is just cleared, and after about three crops abandon it, and clear another portion of forest. Mr Chapman imagines that all the land which is now bare of timber has been made so by this custom of the natives; but I hardly think such can be the case. It is to be taken into consideration, that potatoes have not been grown in the island for more than fifty years; and the natives must have been both very much more numerous and industrious to have cleared such a quantity of land in such a short time. Although I do not think the growth of potatoes sufficient to account for the absence of forest over a great part of the country — perhaps more than half — yet it is certain the wood has decreased from some cause or other, within no great distance of time; as I constantly found logs and roots lying in the wet ground of the barren moors, where they could not have been brought by any natural causes; and they were too distant from any place where they grow at present, as well as too useless, to have been conveyed there. The natives now yearly destroy large quantities of land by their wasteful systems of agriculture, and in time there will be no timberland left . . .

In other parts of his account Bidwill wrote about the "constant fires" in the bracken fern growing on the old cultivations.

After many years of enquiry N. L. Elder (1956) concluded that many of the clearings in the Taupo-Ahimanawa-Kaweka area are old Maori forest cultivations and that burning to clear land for cultivating potatoes and kumara caused the destruction of forest in the Waipunga and Mohaka valleys and over other areas.

Johnson described forests on fire in several districts between Auckland and Rotorua in the early summer of 1847. Regarding one area near the present town of Pukekohe he wrote:

. . . it was painful to see the destructive way in which they were carrying on their cultivation by setting fire to the wood — hundreds

of noble trees were lying about, charred and blackened or standing deprived of bark and leaves, and some were still burning . . .

On the Patetere Plateau near Rotorua he described cultivations with a summer village of a few huts:

. . . as usual cut out of the wood, which after being occupied for three years, will be abandoned, and in this way the natives, in both senses, eat their way into the forests, which are thus diminished every year in extent . . .

A well recorded example of forest being destroyed was given by Chapman and Johnson at Waharoa (site of the Matamata mission station). Chapman in 1842 wrote:

. . . the introduction of sheep and cows among the natives would . . . in a few years save them from the necessity of destroying valuable timber lands, merely to grow potatoes. With the present prospect of the country, the annual destruction of the timber is a matter of extreme regret. Matamata eight years ago was a fine wooded plain, standing in a rich, open and most fertile valley. In a few years the whole will be swept off, and no growing timber left nearer than the distant hills. This remark is of general application throughout the whole island . . .

Johnson, in 1847, witnessed the final stages in the destruction of this forest:

We have seen immense volumes of smoke issuing all day from the forest around Matamata and when within two miles of it, we distinctly saw its northern extremity on fire, which extending to the plain had ignited the dry grass and fern and even reached our track. We had to wait until the burning torrent passed before we could continue our route. . . . Near the settlement . . . many trees were on fire . . . hundreds of gigantic trees were in flames from their roots to their topmost branches . . . the beautiful forest I had so much admired on a former visit was now a mass of smoking ashes and charred trunks . . .

Since the ancient Maori had only stone-age tools with which to clear vegetation, he found it easier to keep as far as possible to permanent cultivated areas. When these had diminished in fertility they would be temporarily abandoned and a growth of fern or scrub allowed to develop. Later this would be cleared, again usually by burning; the vegetation not so destroyed would be removed, and cultivation resumed. Where new clearings had to be made in forest, the ground cover would be hacked down and burnt, but generally the tall trees were left standing to be killed by the fires and burnt down in later years (Best).

It is interesting to note that in Malaya the aboriginal tribes still practise these methods (Cole, 1959). Here the "virgin" tropical rain forest yields the most fertile soils, but second-growth vegetation is easier to clear by burning; a fire in this is usually hot enough to destroy most of the vegetation and debris as well as sterilize the topsoil, both checking weed growth and causing a flush of available nitrogen (N. H. Taylor). In most parts of temperate and tropical regions of the world stone-age man used some form of shifting cultivation to grow his crops. Thus were destroyed the woodlands of Europe and, in a similar fashion, the Bantu farmer burnt the forests of southern Africa (Richards, 1952; Laughton, 1937). On the

American continent shifting cultivation has been traditionally practised by the native races and is still a major problem in British Guiana and British Honduras (Richards), Venezuela (Lamprecht, 1958) and Mexico. The *ladang* agriculture of Malaysia, the *kaingin* of the Philippines, and the *taungya* of Burma, Assam, and the hill provinces of India have profoundly affected the forests of south-east Asia (Gill, 1959; Champion and Griffith, 1948; Richards). In West Africa forest ecologists are only beginning to realize the extent to which the indigenous forests bear the imprint of the native farmer (Jones, 1956; Richards). Meanwhile the primitive tribes of New Guinea in their highland retreats still carry on shifting cultivation (Lane-Poole, 1925).

The Maori agriculturists made the discovery that potato crops grew best on freshly cleared land. With the introduction of iron tools and easier methods of making fire they were able to commence forest clearing on a very large scale—just how large remains uncertain, but the observations of people such as Chapman, Johnson, and Bidwill indicate that during the first 60 years of the nineteenth century hundreds of thousands, possibly millions of acres of the indigenous forests were deliberately or inadvertently destroyed.

Many of the early writers commented upon the lack of forests in areas occupied by large tribes. Bidwill recorded that in 1839 for 10 miles inland of "Tawranga" the land was covered with fern, that around Lake Rotorua there was only one small area of forest, that there was no forest for more than ten miles between Rotorua and Atiamuri, and he commented that:

. . . the hundreds of places which are now only covered with fern are now in progress towards becoming barren; owing to the constant fires which the dry nature of that plant causes to spread in a most alarming manner . . .

Dieffenbach, also describing the land around Lake Rotorua, wrote:

. . . generally the country is open and covered with fern. The singular distribution of the woods shows that a great part of them has been destroyed artificially. In some places there are black stems still standing. The destruction was evidently occasioned by the natives burning the wood when clearing patches for cultivation. This method they were obliged to repeat frequently, as soil soon becomes exhausted compelling them to seek fresh spots of ground . . .

Hochstetter wrote about the havoc wrought by fires in the kauri forest, and Durville, in 1840, recorded that, from the beach at Kororareka in the Bay of Islands, all that could be seen was bare hills, without any sign of forest (Wright, 1955). Hooker, also at the Bay of Islands in 1840 (quoted by Bagnall and Petersen, 1948), wrote as follows:

Passing Captain Bateman's some extensive burnt fires were pointed out to me on the hills caused by the natives firing indiscriminately any part of the ground where they wish to commence planting and letting the fires run into noble forests, where immense tracts of land are laid bare and timber of immense value wantonly destroyed . . .

SUMMARY AND CONCLUSIONS

The pre-European Maori used a more or less sedentary form of subsistence agriculture to grow five or six tropical plants, each of which required careful tending and gave only uncertain yields. Even the kumara could be grown only in the warmer districts and could not be relied upon to any extent.

The introduction of the potato some time between 1769 and 1790, probably in 1772 or 1773, gave the Maori a vegetable of familiar characteristics that could be easily and widely grown and, compared with the kumara, gave high yields of a food that could be stored for long periods with less deterioration. For the first time the Maori had a staple food crop.

During the next 70 to 90 years Maori agriculture flourished. Potatoes became an important item of trade and, as early as 1805, large quantities were supplied to trading ships. In the 1860s the Maori tribal system collapsed, their markets disappeared, and their industry was lost.

The effect upon the forest of the itinerant form of agriculture that the Maori used to grow potatoes has been described by many of the early explorers and travellers. That a large area of forest was destroyed cannot be disputed; but just how large this area was will probably never be known. There is good reason for believing that during the first half of the nineteenth century the Maori potato growers cleared away forest at a rate not greatly inferior, if at all, to that at which the European settlers continued the despoliation in the years that followed. If this viewpoint is correct, we must re-evaluate our concepts of the history of the indigenous forest of our country, and consider this as a separate period. It may be that forest ecologists will find in this a valid explanation for the many areas of secondary forest that have puzzled them for so long, and the soil scientists may see a reason for the periods of accelerated erosion that seem to have occurred in many districts during the early part of the nineteenth century.

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