

# Native forests to empires of grass: The construction of New Zealand's grasslands

Paul Star

*Dept. of History, University of Otago, Dunedin, New Zealand*

Peer reviewed contribution

Keywords: forest, grass, tussock, pasture, New Zealand, Southland

**ABSTRACT:** Since the 1850s New Zealand has undergone rapid, wide-ranging and intensive environmental transformation. A country, more than 50% of which was covered in forest and another quarter in tussock, has become one in which 40% is carpeted in English grasses. How and why this transformation occurred and what that teaches us about changing practices of land management are the subjects of 'Empires of Grass', a three-year research project by a group of historians and others through the University of Otago. This paper focuses in particular on changes in Southland, the southernmost province of New Zealand (one of the regions chosen as a case study), in the period up to 1920. The emphasis is on areas such as Edendale (in tussock when European settlement began) and Seaward Bush (then covered in native forest) and their conversion to exotic grassland for sheep or dairy farming. Concern is both with the process of transformation and the factors that drove it.

## 1 INTRODUCTION

The southernmost place in the South Island of New Zealand is about 60 km from the town of Invercargill and is called Slope Point. Here a steep cliff descends almost vertically to the ocean. At the top of the cliff, the end of a fence juts out a further metre to control stock movement, for even at this uttermost edge of New Zealand the original native forest cover has been cleared and replaced with a pasture of European grasses for European sheep to graze.

Of New Zealand's land cover, 39% is now categorised as 'pastoral', with a further 13.5% in tussock (Ministry of Agriculture and Forestry 1997). Certainly not all the indigenous forest has been cleared – it still covers 23% of the surface – but its extent has been very considerably reduced. Estimates vary on the original extent of forest in New Zealand, but it covered much of the land surface. One contributor to the recent *Environmental Histories of New Zealand* informs us that 'Pre-European Maori ... had been involved in the loss of 50 per cent of ... the primeval forest area' (Anderson 2002), while another writes of a broad concurrence that 'about half the colony was forested in 1840' (Wynn 2002).

The purpose of this paper is to describe the ways in which most of the forest of eastern Southland was cleared and replaced by grass. While no area is typical, Southland is as an example of what was also occurring elsewhere in New Zealand at the same time, as well as in some other colonial contexts.

European settlers, particularly after the founding of Invercargill in 1856, concentrated on this eastern part of Southland, which is made up of low ranges and valley plains. They were most interested in the alluvial Southland Plain, an area of about 40 by 65 km around the Aparima, Oreti and

Mataura Rivers. Europeans identified this as potentially good farmland, with long cool winters as a limiting factor. There was sufficient rain - 90 to 140 cm a year on the plains – for the creation of green pasture throughout.

What the European settlers encountered in the middle of the nineteenth century, however, was a mosaic of quite different vegetation types, including tussock country, forest, and wetlands. Some 600 years earlier, before *any* humans came to Southland, almost the entire area was forest. This far south there was never the kauri forest for which Northland is famous, but the two other principal types occurred. In every direction from Invercargill there was mixed podocarp forest, dominated by totara, rimu, kahikatea, miro and matai. Elsewhere there were vast areas of *Nothofagus* forest, ecologically less diverse, consisting almost exclusively of southern beech trees.

Four main types of transformation ensued. In the first case, the forest was already cleared by the time Europeans settled eastern Southland, but further modification was needed to create an environment favourable to cattle and sheep. In the second case, forested land was worked over by saw-millers before being released to settlers. Thirdly, forested land was deliberately burnt and converted to grassland without any utilisation of the timber resource. Fourthly, forested land burnt accidentally. Only in the fifth instance, rare for this part of Southland, did the forest remain.

## 2 AREAS OF PRE-EUROPEAN FOREST CLEARANCE

In a process that began in pre-European times, forest was burnt and fern or tussock grew up in its place (Anderson 2002). The more observant European settlers realised this very early on. J T Thomson, when surveying the tussock country of Southland Plains in 1857, recognised that ‘mounds of red earth ... all over the prairie lands’ had been ‘thrown up amongst the roots by the fallen trees of the forest’ and were ‘surface monuments to the past of New Zealand’. The fallen trees themselves had long since either rotted, or, as the remains of Maori oven pits close by suggested, been used by pre-European settlers as firewood (Thomson 1880).

Modern paleobotanical work suggests that before the appearance of man – and in the New Zealand context that means until about 800 years ago – the whole of Southland was a ‘closed forest zone’, save for a few patches of red and snow tussock on poor soils or wetlands. Since lightning strikes were uncommon, fires were rare even though the area was drought-prone. A fall in tree and shrub pollen and a rise in charcoal deposits point to a dramatic increase in deforestation through fire from around AD 1200. While the occasional maverick scientist gives the key role to sudden proliferation in natural fires following climate change, the great majority of scholars accept ‘anthropogenic deforestation’ as the major factor for change in New Zealand. In plainer English, ‘the fires lit by the first Polynesian settlers greatly reduced the amount of woody vegetation in favour of fern and grassland’ (McGlone 2001).

Possibly some fires were deliberately extensive, to flush moa out of the forest or to clear areas for ease of travel or for plantations of cabbage trees. Other fires may have begun as small ones for cooking or warmth, before racing out of control. Either way, the result was profound. Tussock grassland, an ‘anthropogenic community’ of plant species, became established over much of the Southland Plain. Thus, when the Europeans began to settle Southland in the 1850s, they found not only the indigenous forest but also a ‘*de facto* natural vegetation cover’ of montane and lowland tussock (McGlone 2001).

Because the temperature was too cold for kumara and other crops familiar to them, hunting and gathering remained more fundamental to southern Maori than to tribes further north. They therefore had every reason to value the forest and its wealth of bird and plant life. Whatever they thought of tussock, it had no use for them as land for domesticated stock, since they had no grazing animals until European whalers introduced cattle around 1800.

Progress, to Europeans, depended on an absence of forest, since their economy relied on the grazing of animals or the production of crops, and by the nineteenth century often on both, through the growth of grass and cereal or root crops on open land and by rotation. Tussock represented an improvement upon forest cover since it was a grass that could be consumed by sheep or cattle –

particularly the young tussock shoots stimulated by regular burning. In the open high country of Southland, where terrain and other natural features precluded other possibilities, Europeans made (and still make) the most of what they had, holding land in large units while making relatively little change to the vegetation cover. Their sheep ranged far and wide, gaining what sustenance they could from natural grasses, and there was frequently enough space to accommodate enough sheep for the runholder to make a worthwhile income. While changes to the habitat followed – shorter tussock, a different mix of species, land degradation, erosion, infestation with rabbits and weeds – still it remained predominantly tussockland. But tussock supported a far lower density of European stock than did European grasses. It was also necessary to remove the tussock if land was to be ploughed ready for arable farming. Tussock, therefore, meant the job of transformation of the forest was *half done*.

### 3 COMPLETING UNFINISHED BUSINESS

Lower down, tussock represented unfinished business. Here it grew on alluvial plains that were both sufficiently flat and sufficiently free of woody vegetation to be subjected to cultivation.

The expectation for European settlers in Southland, as outlined in an 1865 pamphlet, was that each family would transform a part of the land – probably part tussock and part forest – into a mixed farm on the European model. Specifically, beginning with capital of £500 and after seven years' hard work, a man could expect to have 'a free farm of his own, with good house, garden and orchard – 90 acres of it in pasture and 30 acres under crop; upon this he could maintain 20 dairy cows and 300 long-woolled sheep, besides a score of pigs' (Murray 1866). Given that the author is writing of an average holding of 120 acres, he must have envisaged total, or almost total, clearance of any forested land.

Sheep roaming about runs, on average perhaps one sheep to every three acres of native grass, was a start, but this would be followed by closer settlement and improved land, either producing cereal crops or growing better grasses. Ability 'to maintain a good permanent pasture of English grass' was 'the ultimate standard of value of all New Zealand land'. The expectation was 'that by adopting a methodic system of cultivating English and other grasses on pastoral land, the productiveness of the land would be increased tenfold' (Murray 1866).

To make tussockland into cropland or into good pasture, it *had* to be ploughed. This process is, explicitly, an overturning of the existing vegetation in preparation for replacing it with different vegetation. A Southland newspaper editorial in 1885 noted that 'the plough, most venerable of agricultural implements, is at once the symbol and the foundation of our prosperity' (*Southland Times* 1885b).

The three-wheel lever-type plough, invented in Scotland and introduced into New Zealand around 1868, was good for ploughing up tussock. The development of this specifically 'colonial plough', as it became known, demonstrates adaptation to local environmental circumstances, even if only in the search for more efficient techniques to alter them.

A parallel degree of adaptation was not evident in the first attempts to use steam ploughing in New Zealand, a 'state of the art' agricultural technique more famously applied to the Duke of Sutherland's Scottish estates from 1871 (Winter 1999). When the Duke began his great experiment, this method had already been employed on a large scale in Southland, financed by a group of Scottish businessmen. The New Zealand and Australian Land Company spent an initial £4,000 on steam ploughs in 1866 (Palmer 1971). These 'puffing and panting monsters', producing about 20 horse power and capable of ploughing ten acres of new land a day, arrived on the Southland Plain in 1867. They were hauled into place by a team of bullocks, and anchors positioned at each of the corners of the block of land to be worked. Four-furrow ploughs on either side of the engine were attached to a steel cable over 1000 m long which slowly wound up around a drum, dragging the ploughs across the ground towards the engine (*Otago Witness* 1867).

This was the most spectacular enterprise in the early days of the Company, which bought up large in New Zealand land from about 1860. By 1866, the Company's representatives already had

20,000 acres of the deforested and increasingly detussocked Southland Plain in cultivation. They planned to bring a further 15,000 acres into use each year. It would be ploughed three times and fertilised with guano, after which it was expected to yield 60 bushels of wheat or 40 bushels of oats per acre (Palmer 1971). They believed it would become the granary of New Zealand, producing exotic crops from a transformed environment, and also providing fine English pasture for sheep.

Ten years later, the Company's manager considered the 125,000 acres of the Edendale Estate, as it was now called, to be an albatross around his neck. The NZALC had, he said, 'spent sacks of gold in the attempt to grow English grass on many thousands of sour land in Southland ... Then in a very few years the English grasses, introduced at such heavy cost, dried out and the land reverted very much to its original wild condition' (Davidson 1930). The grass seed was bulk-purchased in Britain. Typically, 25 lbs of ryegrass, 6 lbs of cocksfoot, 3 lbs of white clover, and 2 lbs each of timothy, cow-grass and alsike were sown per acre (Wallace 1891). None of these species flourished while largely uncontrolled stock roamed over land deficient in calcium carbonate.

The Company eventually extracted itself from the Southland Plain in 1903, having fostered an environment in which small farmers, with fenced paddocks, could work the land profitably. From the 1880s, the Company rendered sour land productive through the application of lime, provided free as an inducement for families to settle on subdivisions of the Edendale Estate. In addition, the Company's dairy factory, by the Edendale railway station, made small-scale dairying an economic proposition by accepting all locally-produced milk for butter and cheese-making.

Edendale was at the cutting edge of change. In the nineteenth century there was a demand for New Zealand's cereal crops in both Australia and Britain, so cultivated land was often put into wheat – or, in the case of Southland, into oats. Since they tended to exhaust the soil, cereals were generally rotated with root crops like turnips and with a temporary pasture of European grasses, both grown as feed for sheep or cattle. While fertiliser was rarely applied directly to grass, grass often benefited from fertiliser provided for the turnips that preceded them (Peacocke 1892). With the development of a market for frozen New Zealand meat and dairy produce in Britain from 1882, and an overall decline in the cereal market after 1900, there was an increasing trend, in Southland and elsewhere, towards permanent pasture in European grasses.

John Hall was one of the first two small farmers to occupy land at Edendale in 1882 (Paulin 1982). The diary he kept from 1891 to 1894 provides a detailed picture of how he farmed his 250 acres. He followed in the mixed farming tradition of his lowland Scottish ancestors, growing up to 50 acres of oats each season, in addition to grass as summer feed and turnips as winter feed for his dairy cattle and his Border Leicester sheep. While still relying primarily on ploughing and spreading dung from his stock to increase the fertility of his soil, he also brought in lime, bonedust and Fison's manure. Hall hand-milked his cows, but, as recorded in almost the final entry in his diary, one or two of his neighbours were already machine-milking in 1894 (Hall 1891-4). By 1907 his son William had converted the property into a modern dairy unit with milking machines, and was a director of the by then co-operative Edendale Dairy Company (Paulin 1982).

Rather than absentee landlords employing a large labour force and steam engines, it was independent small farmers who turned the Southland Plain into rich farmland. At Edendale there was at first a capital injection from a Scottish-based land company. Elsewhere on the Plain, and generally rather later, assistance came from the New Zealand government.

#### 4 SAWMILLING THEN CLEARANCE

What the Company had attempted, and what John Hall and his neighbours completed, was the conversion of an area of tussock into land for crops or for European grasses. They continued a process of transformation from forest that had begun long before European arrival. Elsewhere, Europeans *directly* confronted forest, providing the theme for the second half of this paper. I now turn to the second way that forest became grass – that is, by a deliberate and total European process, begun by milling the larger trees then by burning what could not be immediately utilised, in preparation for settlement and farming.

When Hall bought into Edendale, the only building on his land was a large shed in which the Company had housed its steam ploughs (Paulin 1882). The engines had been sold by then, cheaply, to sawmillers, who employed steam power to cut into Seaward Bush and other areas of native forest (Davidson 1930).

Seaward Bush, in 1850 was an 80 sq km mixed podocarp forest, south of Edendale and immediately east of Invercargill. It remained at the centre of the first map of Southland in 1865, but three sides had already been encroached upon and surveyed into rectangular blocks, with some of those near Invercargill 'let for saw mills'. While it was still Crown land, sawmillers were licensed to fell the best timber trees in particular sections. It was the podocarps they were after, and the kamahi, whose timber was used for railway sleepers. They hauled the logs to the sawmills using bullock teams at first, while horses took the cut timber along tramways into Invercargill.

Beyond the edges of town, it was hard to know what sawmillers were doing further in the forest, but by the 1870s activity was monitored and to some extent regulated by the government-employed inspector of Southland's forests, Duncan McArthur (Star 2004). His job was not to prevent the removal of timber, but to ensure that it did not occur in a wasteful manner.

From about 1874 steam locomotives entered the forest and sawmilling became mechanized. Whenever a partnership dissolved their sawmill plant was auctioned off, and then we gain an exact idea of operations. For instance, Ramsay and Laidlaw disposed of a '20 horsepower engine, breaking-down bench, breast bench, cross-cut bench, planing machine, 5 trollies, tramways, 160 acres freehold land (open) and 800 acres of first-class timber, under Government licence ... and a team of ten working bullocks with bows and yokes complete' (*Southland Times* 1875).

When the sawmillers had abandoned them, the cutover areas were subdivided and sold off – often through deferred payment schemes – to settlers. The settlers burnt what remained of the forest, sowing grass seed in the ashes. In this manner, the surface of the land became pasture for sheep and cattle and so provided an income. A landscape resulted that may be typified by one spot near Invercargill where there had been, in 1860, 'a picturesque rise in dense bush, facing Tramway Road' and where, in 1940, there were 'wide green pastures, without even a stump to remind the younger generation that once it was a forest' (Thomas 1940).

## 5 CLEARANCE WITHOUT SAWMILLING

The third way that forest became grass was again by an entirely deliberate transformation, but without sawmilling. This was the practice in remoter areas where the timber, however good, could not be economically milled because of lack of communications and the absence of a reachable market. Settlement of the forested area immediately above Slope Point proved to be one such case. Here, in 1895, the government facilitated the creation of a 'special farm settlement' called Haldane, with 28 sections of around 100 acres each (*New Zealand Gazette* 1895). It was intended that settlers would eventually buy their sections, the government providing an initial income through road-making and bush-clearing work until their land became productive. Government also supplied fencing materials and grass seed. Rental was determined not by the forest upon each section, but by its so-called 'prairie value'.

While detail varied among the deferred payment schemes operating from the late 1880s onwards, it was expected or required that settlers would have 10% of their holding in grass by the time of the first government inspection and 20% by the second (Arnold 1997). In other words, removal of the forest cover was built into the legislation. This was, anyway, what settlers wished for, since without forest clearance and pasture creation it was extraordinarily difficult for them to gain an income from the land. Bruce Levy, the key figure in the extension of New Zealand's grasslands revolution in the twentieth century, explained that, 'to the pioneer the forest stood between him and a livelihood. It was a menace to be removed as cheaply and as quickly as possible' (Levy 1951).

We know precisely how the forest at Haldane was cleared, assuming the settlers complied with the specifications for this work that the government laid down. These stated that 'the whole of the underscrub ... shall be ... cut close to the surface of the ground'. Once this had been inspected and

passed, 'trees up to a diameter of 18 inches 3.6 [3 feet 6 inches] above the ground, shall be felled, the stumps of felled trees shall not exceed 3.6 in height, above the ground, the whole of the branches shall be lopped from the main trunk of the tree, as it is felled ... no trees may be left hanging, but all must be laid on the ground'. Finally, 'when the felled bush is ready for burning, the whole shall be burnt, all scrub, flax, ferns, rushes and tussocks, and all tree trunks, boughs, branches etc, up to a diameter of 9 inches which may have escaped the fire, shall be gathered into heaps as most convenient, and the whole shall be completely burned' (Haldane 1896-1900).

The settlers at Haldane would have sold timber from the forest if they could, but no-one would buy it. The son of one settler, who had experience in sawmilling, considered erecting a mill, but there was no decent road in, and there was not enough water on the bar at Haldane Bay to allow a large boat to enter. Government offered no assistance in the matter – and, anyway, their help could be a mixed blessing. The initial supply of grass seed was unsatisfactory, with complaints that 'some of the bags came out here last year badly mixed, and some had sweepings of the floor in them'. It was 'inferior cocksfoot seed ... [with] a very large amount of fog therein' (Haldane 1896-1900). The settlers knew their only hope for a regular income lay in the development of good pasture for dairy cattle, but the amount of milk they could supply was never quite enough to support a dairy factory. One was built there in the early 1900s but closed a few years later.

Haldane, like two other special farm settlements in the area, was not a success. According to local sources, 'after some time spent endeavouring to fall and clear the rest of the land, they [the settlers] realised there were easier ways to earn a living, so sold the grass seed and got out' (Hayes and Buckingham 1991). But some stayed on to clear the forest, and present-day Haldane is all, like Edendale, stock grazing grassy paddocks.

The evidence of a North Island writer, presenting an overall picture of conversion 'from bush to farm', suggests that the practice adopted at Haldane was fairly typical (Barry 1913). He recommended that underscrubbing, defined as 'the cutting of all undergrowth to a height of not more than 6 inches from the level of the ground' should be done well in advance of the main felling, to ensure a good burn. Opinion was divided on 'the advisability of felling trees of large dimensions', some maintaining that it was poor practice to fell any trees over 3 feet in diameter. Big burnt trees covered more ground horizontally than standing.

Felled timber was left to lie for at least seven weeks, then burning occurred in settled conditions in December or January, at least a week after any heavy rain. After the burn the area was ring-fenced to keep out stock. It was often also necessary to 'saw passages through the big logs ... in order that the packhorses conveying the seed to the area to be sown can proceed with ease over the log-strewn land'. But the aim was to sow grass seed as soon as possible after the land had cooled. It was broadcast over an area from 12 to 16 feet wide, distributed by hand out of a jute sack that fitted over the sower's shoulder and body. Thus, with 'strenuous and properly applied labour the wilderness can be made to bloom like the rose' (Barry 1913).

The area was usually stocked with sheep or cattle about eight weeks after sowing, to eat off and tread out any regrowth of fern or scrub and maintain the balance in favour of grass, but the finer details of density and duration of stocking were understood by few before the twentieth century. Nor, as we in the case of Haldane, was sufficient attention given to the quality or kind of grass seed sown (Levy 1951).

Removal of logs and stumps after burning depended upon having the time to do it and was sometimes delayed 20 years. There are still areas in the Catlins, close to Southland, where we can experience the bleak landscape of dead blackened standing stumps. The remains of large trees and, in some areas, the wetness of the ground were major obstacles to the creation of worthwhile pasture. Where stumps remained in profusion, ploughing was impossible, so farming was of necessity pastoral rather than arable. But even without the presence of stumps, where ploughing was possible, the ground was often too swampy and therefore also too cold for the sustained growth of grass and stock. Robert Cockerell, an Invercargill blacksmith of genius, played a part in tackling both problems. His patented drain plough, which created irrigation channels underground by dragging along a metal cone deep in the earth, was credited with having 'put a shilling an acre in value on all land in Southland' (*New Zealand Farmer* 1892a).

Another Cockerell invention, the 'Forest Giant', was a 'tree-puller and stump extractor' that greatly sped up, for instance, clearing a way for the first section of railway through Seaward Bush in 1885 (*Southland Times* 1885a). This was probably the mechanism that Fred Twemlow initially used to remove the remains of Seaward Bush that lay on his land. He described it as a steel chain, which could be attached to the offending stump and anchored in two places. A lever tightened the chain by alternately moving two claws, until eventually the weaker anchor gave and the stump sprang free of the ground. But, even then, the freed stump had to be disposed of, so by 1892 Twemlow had adopted another technique, lighting a fire in a hole directly by the stump. When the fire had become 'a mass of glowing embers' he banked it up with earth, 'the object being to get the stump exposed to a fire similar to a brick kiln'. Eventually this burnt the stump (*New Zealand Farmer* 1892b).

## 6 ACCIDENTAL CLEARANCE

The fourth process of forest removal was through unplanned burning, a frequent consequence of deliberate fires. In *New Zealand's Burning*, Rollo Arnold (1994) paints a graphic picture of the colony at a time of drought, emphasising 'the role of fire, both as a tool and a danger'. He identifies fire as 'a major tool of land clearance, but a tool by no means easy to control ... [and] therefore an endemic danger on the settlement frontiers in any dry period'. During a deliberate burn, either of forest or tussock, an unexpected wind change might mean everything went 'desperately wrong', resulting in the ignition of a different area. Equally, and especially in times of drought, a clearance could become 'a great pyre of sun-dried logs and stumps, grass and litter'. All the fires in the summer of 1885-6 that Arnold describes were, more or less, accidental.

The chairman of a national conference of sawmillers in 1901 declared that 'it is common experience and well-established, well-sustained and well-founded belief that unless you stop settlement in the neighbourhood of the bushes owned and being cut you cannot possibly save the timber. Fires arise'. The Commissioner of Trade and Customs, was also 'well aware that as settlement progresses it is simply impossible to keep any small sections of it [the bush] – sawmilling and settlement must go hand in hand' (*Appendices* 1901).

It is also impossible, and perhaps ultimately futile, to sort out the degree of human responsibility for fires of this nature. One Australian historian, Tom Griffiths (2001), has had a good stab at disentangling the climatic, environmental and cultural factors, and individual actions, which precipitated the forest fires in Victoria of 'Black Friday' 1939. Where forest represented an obstacle to settlement and when the weather promised a particularly good burn, some foolhardy individuals may have deliberately started a fire. More will have resulted from carelessness when lighting a pipe or boiling the billy in what botanists call a 'pyrophilic situation' (McGlone 2001). Clearly a major factor, either way, is the circumstance of a particularly dry year.

The forces for agriculture and settlement were in most cases more powerful than those for the retention of Crown land as forest reserve, even in those cases where the reservation had been intended as permanent. In 1904, New Zealand's Surveyor General recommended the removal of state forest status from 49,039 acres of land in Southland. He agreed that 'the proposal is startling in its magnitude, but contended that the necessity for the expansion of settlement in the district far outweighs all other considerations' (*Appendices* 1904).

The actions of officialdom, in cleaning up what was left of Seaward Bush, were complimented by 'natural forces' in the shape of accidental forest fires – most notably those of 17 January 1907 and 19 January 1912. The former swept through 11,400 acres of state forest and Crown land, along the way destroying four sawmills. These were, however, already working well below capacity, since by then there was not much forest left. Of the area burnt, Southland's Commissioner of Crown Lands found 'a large portion was not considered suitable for sowing down with grass, owing to the quantity of timber still standing and lying upon the ground, but upon examination of the State forest and Crown land it was deemed advisable to sow down estimated areas of about 1,425 acres' (*Appendices* 1907).

Towards the end of another very dry summer, the Commissioner (1910b) reported on extensive bush fires that had devastated many of the last remnants of this forest. His advice was again ‘to sow grass seed on the portions that have been well burnt’. He requested £75 to spend on seed for about 126 acres. The mixture – not unlike that used at Edendale twenty years earlier – was to be 10 lbs of ryegrass, 10 lbs of cocksfoot, 3 lbs of timothy and 1 lb of white clover per acre. The aim was straightforward: to facilitate the conversion of the area affected into pasture by the sowing of grass seed upon the ashes.

Table 1. New Zealand export earnings by percentage, 1891-1921

|                       | 1891 | 1901 | 1911 | 1921 |
|-----------------------|------|------|------|------|
| Butter                | 1.6  | 7.0  | 8.4  | 25.6 |
| Frozen meats          | 12.7 | 17.5 | 18.7 | 25.6 |
| Cheese                | 0.9  | 1.9  | 6.3  | 18.8 |
| Wool                  | 43.9 | 29.1 | 34.6 | 12.0 |
| Other animal products | 7.7  | 7.6  | 10.3 | 10.9 |
| Grass seed            | 0.4  | 0.6  | 0.2  | 0.4  |
| Grass-reliant exports | 67.2 | 63.7 | 78.5 | 93.3 |
| Timber                | 1.9  | 2.3  | 2.3  | 1.2  |
| Other                 | 30.9 | 34.0 | 29.2 | 5.5  |

(Derived from figures for export earnings in *New Zealand Official Handbook* 1892 and *New Zealand Official Year-Book* for 1902, 1912 and 1923.)

The notable feature here is not so much the cause of the fires – the degree of accident – but the response. When forest was destroyed, it quite simply did not occur to the Commissioner or anyone else to replant with native tree seedlings. If anything, the remaining pieces of forest were blamed for feeding the fire, causing damage to property and crops. Remaining pockets of forest seemed anomalous. The Commissioner (1910a) found ‘settlers’ bush reserves’, as they were called, ‘very unsatisfactory in more ways than one’. They were no longer needed since ‘the facilities for procuring fencing material and fuel by rail are now so easy and the price much lower than what the cost of cutting from the reserve would be’. They were also a nuisance, since ‘noxious weeds are becoming troublesome and on these reserves large annual expenditure would be required’. The Commissioner (1910c) similarly endorsed opening up the remaining 88 acres of Grove’s Bush, because ‘all the timber suitable for fencing purposes has been removed, and it is advisable to open the land as soon as possible as the Canadian thistles are gaining ground fast’.

Settler preoccupation with weeds was most clearly demonstrated by the adoption of a comprehensive Noxious Weeds Act in 1901. The incursion of weeds onto pasture surrounding forest remnants seemed a far more important matter than the retention of forest on land that might otherwise support more grass.

It was a question, ultimately, of income. Farmers needed money, and this was to be had from pasture, not from forest or weeds. In New Zealand, this was always the case to a high degree, and became even more so. Given the small size of the country’s population, income relied heavily on exports, and even a basic analysis of the figures shows the source of that income (Table 1). By 1921, 93% of export earnings came from animal products grown on grass, while little more than 1% came from tree products grown in the forest.

## 7 FOREST RETENTION

Economics was not the entire picture, of course. There were also cultural considerations behind both the destruction and, on occasion, the conservation of New Zealand's forests (Star 1999 and 2002). In the 1900s, J.W. Marchant, the Secretary for Crown Lands, dismantled the network of supposedly permanent state forests in Southland created by Thomas Kirk in the 1880s. He did so in the belief that 'bona fide settlement is the first consideration in New Zealand, and that we should do everything in our power ... to bring about the expansion, development, and progress of settlement, and the increase of productions to the utmost limit throughout the whole colony'. But as a member of the Government's Scenery Preservation Committee from its establishment in 1903 Marchant also promoted what he saw as 'ample provision ... for maintaining sufficient of our unique forests, fauna, and scenery for the enjoyment of the colonists, and to continue to attract large numbers of Australians' (*Appendices* 1904).

In 1909, the Department of Lands in Wellington requested photographs of Seaward Bush, for inclusion in their annual report. Their Southland representative did what he could for them, with 'the aid of one or two of his bushmen, who ... assisted him in cutting down the lesser scrub to enable a good view of one or two fairly large Rimu ... trees about to be felled'. He regretted, however, that 'the typical trees are ... hard to find, as most of the marketable timber trees have been cut out of the Forests in this part of the District' (Commissioner 1909). There could be no clearer indication of the degree to which Seaward Bush had been obliterated by this date.

But why did Wellington want this photograph? It would appear that, as the process of transformation reached a peak, sentiment grew for what had gone. Now that the area of lowland forest was so greatly reduced, a mechanism was created for the orderly reservation and cataloguing of the little pieces that remained (Park 2001). The Scenery Preservation Act of 1903 effectively legitimised a fifth and final course of action for the forested areas of eastern Southland and elsewhere, which was to leave some of them as forest. This ensured the protection of small remnants of lowland forest that became scenic reserves, scattered like occasional 'control plots' amid the massive agricultural and pastoral experiment that was, and is, European New Zealand.

We are not referring here to those large areas that became national park, such as Fiordland in western Southland, 941,000 ha of which had this status by 1921. The salient features of these areas were generally their remoteness, their high altitude, and their unsuitability for farming.

Nor, surprisingly, are we referring to the retention of native forest for sustainable forestry. This was part of the vision for eastern Southland held by Duncan McArthur and by New Zealand's nineteenth century Conservators of Forests, Inches Campbell Walker and Thomas Kirk. As we have seen, however, state forest designated for sustainable timber production always gave way to settlement and farming whenever this option became possible. Continuing plans for a sustainable native beech industry gained scientific validation through the researches of Leonard Cockayne in the 1920s but were applied only to areas on the periphery, mainly to the west, where farming would not pay.

In a revealing episode, a Seaward Bush Plantation Reserve was created in 1895, at a time when fears of an incipient 'timber famine' were beginning to strike at the hearts of some New Zealanders. This experiment did not protect the 304 acres of native trees involved but, on the contrary, hastened their removal. The Department of Lands noted that 'this land has already been worked by sawmillers, so that nothing but worthless bush remains on it, and it is proposed to fell and burn the underscrub as opportunity offers, and to replace this by useful forest trees, such as oak, ash, elm, spruce, beech, etc.' (*Appendices* 1896). It was duly burnt and planted largely in exotic trees, but the planting was poorly done, the area was imperfectly fenced, and a 'competent nurseryman' could not be found to manage it (*Appendices* 1897). The plantation was abandoned in about 1898 and the area is now farmland.

So what forest does remain in eastern Southland? Catlins Forest Park is located there, covering an area that avoided clearance because of its remoteness. No railway line ever reached it. Part of this forest is visible from Haldane and Slope Point. Also, immediately below the township of Edendale there is a small scenic reserve, which has somehow survived through both the Polynesian

and European eras, when almost all other forest in the vicinity has burnt. As for Seaward Bush, none of it became scenic reserve, though there is Seaward Downs Scenic Reserve to the north, and there is a small recreation reserve of 104 hectares of modified native forest, 5 km from the centre of Invercargill. This has now assumed the identity of 'Seaward Bush', even though it constitutes only an eightieth part of the nineteenth-century forest.

## 8 CONCLUSION

The picture I have described from eastern Southland sources may have wider application. It refers to a European people who came to a land that had already experienced considerable forest clearance. This produced extensive areas of 'natural' grass for sheep and cattle to graze while, elsewhere, more primeval forest was removed from the canvas and a new, sparsely treed landscape of 'smiling farms' painted in. Whether the starting point was tussock or forest, whether the instrument was intentional or accidental fire, whether or not a modicum of the timber resource could be exploited, in nearly every case the endpoint was an empire of grass.

Bodies of research can become very skewed in their emphasis. A recent paper on 'environmental history in Australasia' refers to a disproportionate 'strength and enthusiasm for forest history' in Australia, given that the country has 'vastly more desert than forest cover' (Robin and Griffiths 2004). In New Zealand, an emphasis on forest history may be more justified, given the past dominance of forest. In both cases, though, our work might gain a wider relevance by extending beyond 'forest history' to a consideration of 'grasslands history' as well.

## REFERENCES

- Anderson, A. 2002. A fragile plenty: Pre-European Maori and the New Zealand Environment. In Pawson, E. & Brooking, T. (ed.). *Environmental Histories of New Zealand*. Melbourne: Oxford University Press: 19-34.
- Appendices to the Journal of the House of Representatives*. 1896: C-1.
- Appendices to the Journal of the House of Representatives*. 1897: C-1.
- Appendices to the Journal of the House of Representatives*. 1901: H-5.
- Appendices to the Journal of the House of Representatives*. 1904: C-1.
- Appendices to the Journal of the House of Representatives*. 1907: C-1.
- Arnold, R. 1994. *New Zealand's Burning: The Settlers' World in the Mid 1880s*. Wellington: Victoria University Press.
- Arnold, R. 1997. *Settler Kaponga 1881-1914: A Frontier Fragment of the Western World*. Wellington: Victoria University Press.
- Barry, P. 1913. From bush to farm: Felling, burning, and grassing of bush country. *New Zealand Journal of Agriculture* 7: 595-600.
- Commissioner of Crown Lands, Invercargill. 1909. Letter to Secretary of Crown Lands, Wellington, 6 August 1909. National Archives, Dunedin.
- Commissioner of Crown Lands, Invercargill. 1910a. Letter to Secretary of Crown Lands, Wellington, 6 January 1910. National Archives, Dunedin.
- Commissioner of Crown Lands, Invercargill. 1910b. Letter to Secretary of Crown Lands, Wellington, 18 February 1910. National Archives, Dunedin.
- Commissioner of Crown Lands, Invercargill. 1910c. Letter to Secretary of Crown Lands, Wellington, 4 October 1910. National Archives, Dunedin.
- Davidson, W.S. 1930. *William Soltau Davidson, 1846-1924*. Edinburgh: Oliver and Boyd.
- Griffiths, T. 2001. *Forests of Ash: An Environmental History*. Melbourne: Cambridge University Press.
- Haldane Improved Farm Settlement Association. 1896-1900. Minute book. Hocken Library, Dunedin.
- Hall, J. 1891-4. Diary. Hocken Library, Dunedin.
- Hayes, R. & Buckingham, H. 1991. *The Waters of the Waikawa River: A History of the Quarry Hills and Amalgamated Schools and District*. Invercargill: Quarry Hills Schools' Centennial Committee.
- Levy, E.B. 1951. *Grasslands of New Zealand*. Wellington: Government Printer.

- McGlone, M.S. 2001. The origin of the indigenous grasslands of southeastern South Island in relation to pre-human woody ecosystems. *New Zealand Journal of Ecology* 25 (1): 1-15.
- Ministry of Agriculture and Forestry. 1997. Land cover database: New Zealand. [http://www.maf.govt.nz/statistics/primary\\_industries/landcover/tables/11-1c-nz.htm](http://www.maf.govt.nz/statistics/primary_industries/landcover/tables/11-1c-nz.htm).
- Murray, J. 1866. *A Description of the Province of Southland, New Zealand*. Invercargill: Harnett and Co.
- New Zealand Farmer*. 1892a. 12 (2).
- New Zealand Farmer*. 1892b. 12 (3).
- New Zealand Gazette*. 1895. 1 (8): 31 January 1895.
- Otago Witness*. 1867. 21 September 1867.
- Palmer, M. 1971. The New Zealand and Australian Land Company in nineteenth century New Zealand. PhD thesis, Dunedin: University of Otago.
- Park, G. 2001. *Effective Exclusion? An Explanatory Overview of Crown Actions and Maori Responses Concerning the Indigenous Flora and Fauna, 1912-1983*. Wellington: Waitangi Tribunal.
- Paulin, K. 1982. *The Story of John Hall and his Descendants*. Edendale: The Hall Family Centennial Committee.
- Peacocke, G. 1892. The formation of permanent pasture. *New Zealand Farmer* 12 (7): 274-275.
- Robin, L. & Griffiths, T. 2004. Environmental history in Australasia. *Environment and History* (forthcoming).
- Southland Times*. 1875. 11 January 1875.
- Southland Times*. 1885a. 16 May 1885.
- Southland Times*. 1885b. 8 August 1885.
- Star, P. 1999. Place of native forest in New Zealand's mental landscape, 1874. In Dargavel, J. and Libbis, B. (ed.). *Australia's Ever-Changing Forest IV*. Canberra: Centre for Resource and Environmental Studies: 85-98.
- Star, P. 2002. Thinking about New Zealand's forests, 1900-1914. In Dargavel, J. et al (ed.). *Australia's Ever-Changing Forests V*. Canberra: Centre for Resource and Environmental Studies: 399-409.
- Star, P. 2004. Doomed timber: Towards an environmental history of Seaward Forest. In Ballantyne, T. & Bennett, J. (ed.). *Landscapes and Communities*. Dunedin: University of Otago Press (forthcoming).
- Thomas, M.C. 1940. *Yeomen of the South*. Invercargill: Southland News Company.
- Thomson, J.T. 1880. Abstract of inaugural address to the Southland Institute. *Transactions of the New Zealand Institute* 13: 458-462.
- Wallace, R. 1891. *The Rural Economy and Agriculture of Australia and New Zealand*. London: Sampson Low.
- Winter, J. 1999. *Secure from Rash Assault: Sustaining the Victorian Environment*. Berkeley: University of California Press.
- Wynn, G. 2002. Destruction under the guise of improvement? The forest, 1840-1920. In Pawson, E. & Brooking, T. (ed.). *Environmental Histories of New Zealand*. Melbourne: Oxford University Press: 100-116.