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Weeds, People and Contested Places

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ABSTRACT

In the Western world weeds have been defined and redefined according to the cultural ideas and outlooks of peoples who have tried to compete with them for open places, over many millennia. Somewhere along the way ‘weed’ emerged as a concept, and became embedded in and expressed through language. In the first part of this synoptical essay some of the expressions of the changes in human perceptions of, and responses to, a group of plants with which people have had to contend for places, and the deeper cultural significances of the contest itself, are explored. In the second, the inter-societal relationships between weeds and humans are explored in the unique context of New Zealand’s discrete landscape and the settler society which transformed it within the comparatively short period of two centuries. Possibilities for ongoing studies of the weeds–people relationship within New Zealand and other regional contexts are offered.

KEYWORDS

Weeds, weediness, colonisation, invasion, New Zealand

‘In naming a plant a weed, man gives proof of his personal arrogance.’

Jean Rostand ¹

INTRODUCTION

In a relatively young country like New Zealand the opportunity arises to study in some detail the evolution of a new flora, induced by European settlement, and the evolving relationships between that flora and those who induced it.² The

pioneer New Zealand ecologist, Leonard Cockayne, considered that such studies would be 'of the greatest scientific and economic interest not only with regard to New Zealand botany, pure and applied, but also because they may shed much needed light upon the evolution of floras and vegetation in general'. That the plants introduced into New Zealand and into much of the New World from the Old were 'some of them the most aggressive weeds in Europe', heightened the element of conflict within the relationship.³

New Zealand presented a singular advantage for Cockayne and others who looked to ecology to gauge the effects of invasions by alien plants. The invasion of this relatively small, isolated archipelago has been documented more or less continuously, although somewhat haphazardly, from the earliest European contact period.

If the evolution of a country's flora was a proper study for the ecologist, the evolving relationships and conflicts between the weedy flora and those who induced it, is the province of environmental history. But, in order to understand a relationship that, in New Zealand, has developed over a comparatively short period of two centuries, it must first be set within the context of the several millennia during which people and their weeds have contested places.

What is attempted here is firstly a synopsis of a range of history-writings, not necessarily historiographical in content or intent, about a societal conflict between weeds and people. This might in due course inform a fuller study of the conflict as it occurred in nineteenth- and early- to mid-twentieth-century New Zealand.⁴ Constructing such a context in this essay may also serve as a point of contiguity for regional studies elsewhere of the weed–people relationship. The second part of the essay considers a selection of writings that illustrate several trends of thought (scientific, academic, legislative) on the subject, expressed both within New Zealand's settler society, and about that society by 'outside' observers. The extent to which those threads running through the New Zealand discourse either reflected or initiated similar trends elsewhere might again inform further and fuller regional studies.

From what follows, it might seem that the historical literature touching on weeds is extensive. Writing about the history of weeds has, however, generally been incidental to some other purpose, usually scientific or geographic, sometimes philosophical or moralistic but only occasionally historical. Those who have approached the history of the people–weeds relationship thus far have done so from disparate points of view, bringing disparate agendas to the discourse and addressing disparate audiences. Only recently, and then largely within North American environmental history-writing, has any attempt been made to draw those threads together; in New Zealand, seemingly, not at all.⁵

In what follows I have adopted Clarence Glacken's approach of taking illustrations from several places and from different periods. With Glacken, I acknowledge that 'this procedure is open to the obvious criticism that isolated illustrations have little value in interpreting the nature of change over such a large

area or over so long a period'. But I also share his view that in the absence of any coherent body of knowledge, 'they show that certain attitudes did exist'.⁶

In all other respects I have sought to allow the various sources to speak for themselves, so as to avoid, in Frank Uekoetter's words, the 'value laden approaches that only enable historians to reproduce in history certain normative assumptions that they [themselves] subscribed to from the outset'.⁷ The views and positions to which my sources subscribed, rather than my own, are central to Uekoetter's 'organisational approach' to the writing of environmental history.

ORIGINS AND DEVELOPMENT OF THE 'WEED' CONCEPT

'Weeds' and 'weediness' are two ideas that have been constructed and reconstructed across millennia. The flora which have come to be called weeds and we, the species which has called them that, have been contesting places for something like ten thousand years. We know from what the palaeobotanists can tell us of Earth's inter-glacial and post-glacial landscapes, that weeds occupied many of those places long before the contest began. We know too, that the great cultural changes of the Neolithic altered the people–nature relationship as agriculture rippled outwards from the Fertile Crescent.

Somewhere along the way 'weed' emerged as a concept, and became embedded in and expressed through language. Some of the historiographical expressions of the changes in human perceptions of, and responses to, a group of plants with which we have had to contend for places, and the deeper cultural significances of the contest itself, are explored in this essay. Within the literature we can trace the ravelling and unravelling of a set of ideologies from the Neolithic, across the Old World and into the New, and from both places into colonial and post colonial Australasia, particularly New Zealand.⁸

Drawing some of the fragments together gives merely the appearance of a coherent historiography. It also becomes apparent that, however simple the idea of weediness may seem at first sight, it is not. It may seem obvious, for instance, to a mid-western American farmer, that 'weeds' have become so, not from any inherent character, but because they 'take territory and profit from agriculture in some way'.

But if that is all there is to it, why do we still find ourselves considering such questions as, which are weeds, and which are 'not weeds'?⁹ Perhaps 'weediness' is a category of nature?¹⁰ Or is it a set of cultural constructs, particular to people, place and time, something idiomatic? Or something more? Something, perhaps, to do with an evolving relationship between a range of remarkably successful organisms and one competing species, ourselves?

What, to begin with, has been the understanding of the word itself and of its place in western language and culture? That, it seems, is largely dependent on place and time. Lawrence King, lately of the Biology Department at the State

University College of New York, published in 1957 one of the few discussions of some early forms of the weed concept. This, and his 1966 study of weed biology and control factors, considered the history of the term 'weed'.¹¹ He found that the ancient near-eastern languages (Egyptian, Sumerian and Assyrian) apparently did not have an equivalent, collective term, all plants being considered useful.

On the other hand, as we might have known, the Greeks had a word for it. Theophrastus (c.372-c.287 B.C.) used βότανη (botáne) as 'noxious herb', and thus 'weed'. And although weed and weeding concepts were used by Roman writers like Pliny, Virgil and Columella, the modern term has no apparent Latin counterpart. Rather, it is to the ninth-century Old English *weod* that King suggested we might look or to proto-German forms of *weyt* (c. 1150) or the later Belgian *weedt* (c. 1576) and Dutch *weet*, each of which refers to the dye-plant woad, omnipresent in Europe, North Africa and Asia.¹²

We are left then with an English term that appears to have arisen from Proto-Germanic derivatives, a singular noun with no evident intrinsic meaning. It is, King speculates, perhaps 'another example of language as accidental usage'.¹³ And so to define the term, he says, one is dependent upon purely anthropic considerations. He reduced an extensive collection of these, from various sources, to ten principal characteristics, couched in distinctly antipathetic language.¹⁴

On the other hand, Sir Edward Salisbury, late Director of the Royal Botanic Gardens, Kew, writing in 1961, contented himself with characterising a weed as 'a plant growing where we do not want it'. He admitted qualifications, but doubted that a more precise definition is practicable:

In general we may say that a certain aggressiveness is implied that defies easy control, but here again the quality is one that exhibits itself in one environment and not in another.¹⁵

At the same time, it is part of the essence of our concept of a weed that it does in fact flourish and must be 'kept in its place'.¹⁶ Neither King nor Salisbury, however, addressed what is perhaps *the* most fundamental dimension of the ideology of weeds. The conceptual transitions between such terms as 'casual', 'troublesome', 'pest' and 'noxious' have essentially been triggered by and constructed from human experiences wherever and whenever plants behave in ways inimical to our interests. Salisbury came close to the nub of the relationship when he referred to the toxicity of particular arable and pasture plants. Plants like hard rush, ragwort, hemlock, and darnel have had consequences which have been observed and remarked upon at least since Virgil wrote *The Georgics* and, in some instances, from Neolithic times.¹⁷

Like King, Salisbury used the results of archaeological research to reconstruct the forms of association between, and colonisation of, the open habitats of both pre- and post-Neolithic Europe and Britain by humans and their plants. But

because the possible existence of weed species in Britain prior to human colonisation rests on contradictory evidence some of his conclusions are speculative.¹⁸

Nevertheless, he has made one point that is particularly pertinent to the environmental historian:

The capacity of a species to maintain itself without the adventitious aid of the artificial conditions created by man, which usually implies a reduction in competition pressure, is a feature of prime significance.¹⁹

That, as we shall see, is something with which several prominent nineteenth-century naturalists had difficulty in coming to terms. Salisbury argued that the degree to which weeds owe their efficiency to natural or human agency, at least in remote times, is largely unresolved.²⁰ That environmental historians ought to give more agency to nature is a matter that has been remarked upon elsewhere and quite recently.²¹

A contemporary of Salisbury, Charles Elton, of the Oxford Botanic Garden Bureau of Animal Population, took a firmer line on the question of agency. Elton noted in his 1958 book, *The Ecology of Invasions by Animals and Plants*, that few alien plants are capable of invading natural closed vegetation ecosystems. The majority tended to live in habitats 'drastically simplified by man', places like arable farmland, waste dumps, roadsides and railway tracks. In post-glacial Britain, plants like sea plantain and scentless mayweed, now regarded as weeds, were widely distributed in an open tundra landscape with low competition pressures. Elton's view was that the maintenance of what he called the 'conservation of variety', now commonly referred to as biodiversity, provided the most effective means of combating ecological instability brought about by accidental or deliberate introductions of alien plants or animals into indigenous habitats.²²

In his 1986 history of the British countryside Oliver Rackham's attitude to weeds stands in marked contrast to that of King and Salisbury. Weeds are, he says, quite simply 'very specialised plants, intimately linked to farming'. Many could not survive in the wild, being unable to withstand shade and with little power of competition. Rackham sees weeds as part of 'the ordinary landscape ... made by both the natural world and by human activities, interacting with each other over many centuries'. Ordinarity is not, he says, an easy idea to grasp. A couple of centuries ago the countryside stood, as the world of Nature, in contrast to the town. 'The opposite exaggeration now prevails: that the rural landscape, no less than Trafalgar Square, is merely the result of human design and ambition.' The other player in the game, Nature, is hardly mentioned. The concept of countryside as recent artefact prevails.²³

Rackham considered that any certainty about which are weeds and which are not is comparatively modern. Late-glacial survivors got a new lease of life with the arrival of Neolithic agriculture, with its monocultures and open places. Others, introduced from the Near-Eastern homelands of agriculture, 'attached

themselves to farming and found a new function'. Roman introductions like ground elder remained garden plants until recently. Tollund Man, from the Danish Iron Age, ate goosefoot and persicaria in his execution porridge. Seed cleaning and a reduction in crop varieties initiated a modern decline in weeds. That might be welcomed by some, but:

even here it is arguable that enough is enough. Mediterranean peoples live with weeds, enjoy them, and eat some of them. Weedkillers seem to have killed the wrong weeds ... Weeds are part of the historic flora and should be protected from dying out altogether.²⁴

King's, Salisbury's and Rackham's syntheses give us an approximate measure of where and when some plants became the Other, and of where and when humanity, at least in the West, began to conceptualise and articulate weediness. From such starting points it becomes possible to trace a fluctuating Otherness. A reconnaissance of the historical landscape from the medieval to the modern illustrates something of the complexity, confusion and ambivalence that has attached to weed species, and which moved into new worlds with European colonisers and their flora.

WEEDS AND MORALS: FROM MEDIEVAL TO MODERN

In her introduction to her 1995 book, *A Medieval Herbal*, Jenny de Gex makes the point that the early herbals reveal a different universe from our own. Each plant, or its parts, had 'virtues' and 'signatures'. The virtues of the bramble, for instance, were that an infusion of it 'surely healeth' sore ears or eased menstruation. Its leaves healed heartache and its blossoms, wounds. Any part of it 'seethe[d] in wine to the third part' relieved infirmity of the joints.²⁵ Signature related to some physical characteristic(s) of a plant. The red juice of St. John's wort, for example, 'signified its power to heal wounds'.²⁶

Weeds took on a less roseate hue under Will Shakespeare's pen. Dark forces emanated from Elsinore when Hamlet reflected on his father's death:

Fie on't! O fie! 'tis an unweeded garden,
That grows to seed; things rank and gross in nature
Possess it merely. That it should come to this!²⁷

'Darnel hemlock and rank fumitory' or 'hateful docks, rough thistles, kecksies, burrs' speak of social and political turmoil.²⁸ The pre-Romantic hierarchy of plants, thought to mirror the human condition, is reflected, too, in Shakespearean imagery:

Out of this nettle, danger, we pluck this flower, safety.²⁹

Elizabethan aversion to weeds is reflected in Antony FitzHerbert's *Boke of Husbandrie*, published in 1523. May heralded the 'tyme to wede thy corn'. The sixteenth-century English farmer had to deal with 'divers manner of wedes', like nettles and dodder, which 'doe moche harme'. Thistles, docks and kedlokes (charlock), darnolde (darnel) and gouldes (corn marigold) were bad enough. Dog fenell [sic] (stinking mayweed) 'is the worst weed that is except terre' (hairy vetch).³⁰

Such weeds and the hard labour they demanded were a far cry from the land of Virgil's *Georgics*, the land that needed no farming, 'the soil that needed no harrowing' and the Golden Age of Hesiod's *Theogony*.³¹ Those Arcadian myths would, however, survive the powerful Judeo-Christian theology of the Garden and the Fall, symbolic of good and evil, punishment and atonement, which abound among the plants and fruits of the Old and New Testaments.

W. E. Shewell-Cooper, Principal of the Missionary Horticultural College at Thaxted, Essex, in the 1950s and 60s, saw the human condition after the Fall, (Genesis 1:4), as a transition from Arcadia, a life without toil, to 'a battle with weeds ... a hard life of sweat and toil'.

Thenceforth, the Other had to be always contended with:

And on all the hills that shall be digged with the mattock, there shall not come thither the fear of briars and thorns (Isaiah 7:25).

The New Testament parable of the sower carries the same message, couched in the language of grim competition:

And some [seed] fell among thorns; and the thorns sprang up; and choked them (Matthew 13:7).³²

The imagery is particularly explicit in the 'Parable of Weeds Explained', (Matthew 13:33):

The one who sowed the good seed is the Son of Man ... The weeds are the sons of the evil one and the enemy who sows them is the devil ... The Son of Man will send out his angels and they will weed out of his kingdom everything that causes sin and who do evil. They will throw them into the fiery furnace, where there will be weeping and gnashing of teeth.³³

Michael Zohary, Professor Emeritus of Botany at the Hebrew University, Jerusalem, explored the relationships between 'biblical man' and his natural environment.³⁴ Zohary's 1982 work points to a conceptual, if not a textual, consistency across time and translation. Solomon gilded his lily among the brambles (Song of Solomon 2:1–2). Christ's tormentors mockingly crowned him with one or other of the dozen or so spiny species that grow around Jerusalem (John 19:5). The crackling of thorny burnet in a cooking fire 'is the laughter of fools; this also is vanity' (Ecclesiastes 7:6).

Each tree could be recognised by its fruit:

For figs are not gathered from thorns, nor are grapes picked from a bramble bush.
[The good man brings good things out of the good stored up in his heart and the evil man brings evil things] (Luke 6: 44–45).³⁵

In the early thirteenth century the cleric Alexander of Neckam developed this theme of governance of the earth by moral rather than biological causes. The degraded state of mankind and the natural world served as a constant and painful intimation of the Fall and all that had been lost. That poisonous plants now exist when once there had been none, and that they brought unease into the world, were continuing reminders of the consequences of humanity's pride and deceit.³⁶

Post-Reformation reinterpretations of the biblical place of people in the world expanded on the idea of deterioration in nature after the Fall. The earth had degenerated. Thorns and thistles grew up where once there had been fruits and flowers.³⁷ Some commentators revisited ideas of order and purpose, and human domination of the 'lesser' creation, one of the central ideas of Judeo-Christian theology. 'Thou hast given him dominion over the works of thy hands; thou hast put all things under his feet' (Psalm 8:6).³⁸

Taking his cue from natural theologians like John Ray (1627–1705), the herbalist William Cole, in his *The Art of Simples* (1656), thought that even weeds and poisons had their purpose. It required 'the industry of men to weed them out ... Had he nothing to struggle with, the fire of his spirit would be half extinguished.'³⁹ The English jurist, Sir Matthew Hale (1609–76) went further. Not only did order and purpose exist in the world, but Man also had a duty to exercise his growing control over nature. Hale believed, from his reading of Genesis, that:

Man was invested with the power, authority, right, dominion, trust and care ... to preserve the Species of divers Vegetables, to improve them and others, to correct the redundancies of unprofitable Vegetables, to preserve the face of the Earth in beauty, usefulness and fruitfulness.⁴⁰

Hale could also look back to Aristotle and the Stoics for support for the belief that nature existed solely to serve humanity's interests.⁴¹ By his 'superintendent industry' Man could prevent the world becoming 'overgrown with excessive excrescences', a wilderness of trees, weeds, thorns and briars. Thomas Sprat (1635–1713), historian of the Royal Society, advanced Hale's position another step. Deteriorated nature could be improved by art. Environmental improvement could come from plant introductions, by using animals and by 'comparative husbandry'.⁴²

So too, the seventeenth-century farmer drew a distinct line between crops and weeds. The latter were 'an obscenity, the vegetable equivalent of vermin'. To a thorough agricultural improver like Walter Blith gorse, ferns, rushes, bracken and broom were 'such filth'. The eighteenth-century agricultural writer William

Ellis went so far as to lump marigolds, wild irises, honey suckle and water lilies in with weeds. The late seventeenth-century aesthete Roger North proclaimed that 'weeds have no beauty'.

But in seventeenth-century London, willowherb, foxglove and poppies, the last the bane of wheat growers, were sought by gardeners as decorative plants. A mid-century herbalist, William Gerard, noted that some gardeners were wont to 'feast themselves even with varieties of those things the vulgar call weeds'. He admitted that, 'narrowly observed' there is 'a great deal of prettiness in every one of them'. Country gardens, too, could include scabious, campion and larkspur. Keith Thomas tells us that well-known late eighteenth-century gardeners like William Hanbury 'thought heather very elegant and looked kindly on meadowsweet and even thistles'. The agricultural writer William Marshall considered blackberry flowers were 'beautiful beyond expression'. 'Rude, cultivated' tracts of gorse and broom in the royal gardens at Richmond did not, however, impress the Scottish philosopher and agricultural improver, Henry Home, Lord Kames (1696–1782).⁴³

Another group perceived weeds differently too. Herbalists and apothecaries had never doubted the medicinal value of wild plants. William Turner, whose herbal was published in Cologne in 1568, worried that 'precious herbs' were dismissed by the ignorant as 'weeds or grass'. Allied to the herbalists, a growing band of naturalists like Robert Sharrock could see beauty in the great-horsetail of bogs and ditches. 'Botanists', wrote Samuel Pegge in his *Curialia Miscellanea*, penned in 1796 and published in 1818, 'allow nothing to be weeds'.

Both groups took a utilitarian view of the plant world. New discoveries considered to be of medicinal value were recorded and transplanted to 'physic gardens'.⁴⁴ There is a tradition that the Swedish naturalist Carolus Linnaeus (1707–78) fell on his knees at the sight of English gorse 'the enemy of every improver ... and gave thanks for so beautiful a plant'. (Some would have it that it was in fact Johann Dillenius, Sheridan Professor of Botany at Oxford from 1734.)⁴⁵

Other modes of European thought added to a growing confusion about the people–weeds relationship. In the course of one of his critiques of natural theology, the German poet, dramatist and scientist, Johann von Goethe (1749–1832) used weeds to illustrate both the anthropocentric nature of the relationship and the tenuousness of the teleology invoked by the natural theologians. It came as no surprise, given the nature of human experience, that mankind should see itself living in a purposeful world as an end of the creation. The word 'weed', however, revealed the misconception:

Why should [man] not call a plant a weed, when from his point of view it really ought not to exist? He will much more readily attribute the existence of thistles hampering his work in the field to the curse of an enraged benevolent spirit, or the malice of a sinister one, than simply regard them as children of universal Nature,

cherished as much by her as the wheat he carefully cultivates and values so highly.⁴⁶

INTO THE NEW WORLD

The late eighteenth-century American agricultural writer John Lorain took a similar line, albeit at a more practical level. The effect of American settlers' farming practices on soil fertility concerned him. He recognised the interdependency of species within ecosystems, and particularly the role of the smaller organisms ('animalcules') and decaying vegetable matter in maintaining soil fertility:

The fertilizing effects of the perfect system of economy is equally clearly seen in our glades, as in our forests, where nature is suffered to pursue her own course ... The same may be said of weeds, notwithstanding slovenly farmers complain still more loudly of the injury done by them.⁴⁷

He doubted the notion that soil impoverishment is the result of some biblical curse. Weeds were not the cause, although perhaps an effect. He saw soil impoverishment as an even greater curse.⁴⁸

The Romantics and their precursors, too, were articulating other thoughts on weediness. William Cowper (1731–1800), in his long poem on rural themes, *The Task*, written towards the end of the eighteenth century, venerated the fern and gorse on an overgrown common. John Clare (1793–1864), the poet–gardener son of an impoverished Peterborough labourer, wrote frequently of the beauty of common agricultural weeds like ragwort, yarrow, rushes, spear thistle and corn poppies. John Loudon (1783–1843), Scottish founder and editor of *The Gardener's Magazine*, told his readers that briar, sloe thorn, fern and bramble 'would, if introduced into the picturesque grounds of a residence, have a most enchanting effect'. John Ruskin (1819–1900) thought a flower garden an 'ugly thing' compared to wild nature.⁴⁹

Across the Atlantic, Henry Thoreau (1817–62), thought the wild meadow grasses, into which the Pilgrims had stepped two centuries earlier, were more rank, the forests more extensive and open, the trees larger, and the animal population more diverse. The strawberries, the gooseberries, raspberries and the currants were far larger and more abundant than any he knew.⁵⁰ Thoreau, ever the romantic journalist, looked back to the mythical Golden Age.

In the century following the Pilgrims, Rational Europe had busied itself subduing Nature in its front gardens. Unlike Thoreau, French writers like Buffon (1707–88) and Raynal celebrated man's role in transforming the landscape. Raynal believed that the European colonists' capacity to change their environ-

ment distinguished them from 'Indians'.⁵¹ The Philadelphia physician and politician, Benjamin Rush (1745–1813), thought cultivation of a new country by 'draining swamps, destroying weeds, burning brush and exhaling the unwholesome or superfluous moisture of the air' helped to render it healthy.⁵²

To another contemporary writer, the changes wrought upon the New World landscape were reminiscent of something far greater. Writing to a colleague, the clergyman–physician and agricultural improver Jared Eliot enthused:

Take a view of a Swamp in its original Estate, full of Bogs, overgrown with Flags, Brakes, poisonous Weeds and Vines ... The baleful Thickets of Brambles, and the dreary Shades of the longer Growth ... [then after it is drained] Behold it now clothed [sic] with sweet verdant Grass, adorned with the lofty wide spreading well set Indian-Corn; the yellow Barley; ... a wonderful Change this! and all brought about in a short time; a Resemblance to Creation ...⁵³

Eliot's correspondent begged to differ. Practical John Bartram (1699–1777), the first American to lay out a botanical garden, had observed that the entanglement of mud and debris, brought down by floods, among the hazels, weeds and vines of the bottomlands, maintained soil fertility in riverside lowlands. Clearing the weeds would prevent the deposition of debris and enhance soil erosion.⁵⁴

Nevertheless, in the New World, as in the Old, the improvers took the moral high ground. Edward Johnson envisioned the transformations from savage to civilised as 'the planting of a garden, not the fall from one; any change in the New England environment was divinely ordained and wholly positive'.⁵⁵ That, of necessity, included the introduction of Old World weeds. Divinely ordained or not, two rather less positivist commentators recorded that laws were introduced in Connecticut, Massachusetts and Rhode Island at various times during the eighteenth century, to control barberry, a vector in wheat blast disease.⁵⁶

Weeds were one of humanity's camp followers, a global phenomenon, in both the Old and New Worlds of the American lawyer, politician, philologist and diplomat George Perkins Marsh (1801–82). He found that many of the species he had collected during his travels were equally at home in the wheat fields of Upper Egypt, the gardens of the Bosphorus or the cultivations of New England. Man transplanted them.⁵⁷ Nature propagated them. In this instance Marsh granted equal agency to both.⁵⁸ In the struggle that often followed, one or the other might flourish. In some districts in China, weeds had been entirely eradicated. Elsewhere, long after the abandonment of some rural cottage, luxuriant weeds were the only sign that man and his buildings had once existed.⁵⁹ Using the language of rational analysis, Marsh sought to lay open the processes that bound these organisms together.

He had long been a progressivist, albeit a cautious one.⁶⁰ He saw agricultural man as an improver (and, for that matter, an improvement; Marsh saw rural

America in 1847 as the outcome and ‘first example of the struggle between civilised man and barbarous uncultivated nature’). Natural science would contribute much to improving agricultural practice. There were also benefits to be had from improvements to existing farming techniques, including the ‘extirpation of thistles and other weeds, and the destruction of noxious insects’. But things could go too far. Some New England hillsides, stripped of forests, had lost their thin soils to erosion ‘in the rage for improvement’ and now yielded no crop ‘but a harvest of noxious weeds to infest with their seeds the rich arable lands below’.⁶¹

Marsh marked a paradigm shift in the man–nature discourse and the language that structured it. Man ‘modified’ nature rather than the reverse. With Marsh the new relationship found expression as dialectic, ‘a complication of conflicting or coincident forces, acting through a long series of generations’. Moreover the modifications wrought were given a new moral and political dimension.

‘Exploitation’, ‘destruction’, ‘deterioration’ and ‘invasion’ began to colour and shape the discussion among Marsh’s admirers and disciples, and the subsequent environmental debate, for the better part of a century and a half.⁶²

SETTLERS AND SCIENCE: NEW ZEALAND

Since then, in Antipodean colonial and post-colonial literature, two other themes have emerged. Some of the participants turned to the explanatory power of science, in its theoretical and applied forms, to try to understand and in due course to attempt to control the unwanted transformations occasioned by European occupation of new environments and the attempted reconstruction of European landscapes in those environments. At the same time, politics and civic institutions became a forum for expressions of concern about these transformations and a tool against the worst of them. Both occurred in the context of a repetition and, often, a compounding of the North American experience in colonies like Australia and New Zealand.⁶³

Tim Flannery, in *The Future Eaters*, his 1995 ecological history of Australasia, examined the fundamental differences between European and Antipodean ecosystems. The rapidly opening spaces and comparatively young, rich, post-glacial soils of Europe favoured floral species which had the various traits of those species we now call weeds – rapid colonisation of bare ground, fast breeding, wide dispersal, domination of an environment and tolerance of close human settlement:

Mobile, fertile and robust, Europe’s life forms were purpose-made to inherit new lands ... [In the European contest] only the most disturbance-loving hardy and tenacious [had] survived.

On the other hand the ancient, poor soils of the relict Gondwanaland, with their

low energy flows, selected for a diversity of species which, over aeons of time, had become highly specialised, localised and co-operative rather than competitive. One other critical factor influenced what happened next:

... Europeans were blind, and still largely are, to endemism and biodiversity and the importance of these features in an ecosystem. They assumed that all ecosystems worked pretty much like the European ones they coevolved with; with its few tenacious species occupying ranges of hundreds of thousands of kilometres.⁶⁴

Flannery's ecological insight was of course inaccessible to settlers and scientists during the early colonial years. Some of their contemporary responses to weeds and the weediness and the follies resulting from their ignorance have been traced by two post-colonial New Zealand writers. One of them, Gordon Ell, professed to be 'an enthusiast for the outdoors, not a scientist'. The other, Ross Galbreath, came from science to historiography.

Ell's enthusiasm for the profusion of exotic wildflowers-turned-weeds, which have been transplanted into New Zealand from virtually every region of the globe, resembles that of the nineteenth-century Romantics. This multiplicity of both species and origins, Ell wrote in 1983, reflects both 'the sources of our settlers and the seeds and sentiment they brought here'. And he mourns the almost-lost knowledge of their medicinal and culinary properties:

Now that the chemist shop replaces the herb garden, and the vegetable market the roadside patch, the wildflowers are no longer relevant to our survival.

But in a transplanted society, centred upon a utilitarian and improving agriculture, there was little room for sentiment, so that in a very short time the distinction between wildflower and weed became a fine one. Ell was very clear about the mechanisms and agencies involved in this transformation:

Brutally, suddenly cleared of its native cover, New Zealand has grown a new skin ... [in a different climatic and ecological regime] Wildflowers have become 'as common as weeds'.

Moreover:

Their toleration in a country dependent on farming has become unendurable ... In the scientific establishment ... the wildflowers have been a particular concern.

The pursuit of chemical and biological controls for agricultural weeds became an industry in itself. But, Ell argued, there is another side to this realism:

New Zealand shall never be a "virgin" land again. We have remade it with an amalgam of exotic and native wildlife. While it is worth decrying the loss of native species, there remains the fact that much of New Zealand has developed into another country.⁶⁵

Galbreath, in his 1989 biography of Walter Buller, the nineteenth-century New Zealand naturalist, lawyer and politician, explored some of the contemporary scientific efforts to come to terms with this transformation and the attempts to ameliorate, or at least explain, some aspects of it. In particular, he dealt with a nineteenth-century scientific blind alley. Buller and some of his colleagues were attracted to and placed much faith in displacement theory. In their view native flora and fauna, including people, would be displaced by superior European species. They invoked Darwinism. 'It was simply a matter of survival of the fittest.' As an explanatory proposition it had the support of Darwin, Wallace and Hooker. They, each and together, gave natural laws sole agency. In New Zealand W.T.L. Travers, the nineteenth-century gentleman settler, amateur naturalist and politician was one who firmly advocated the theory.⁶⁶

A contemporary, and remarkable, group of largely self-taught settler-scientist-politicians challenged this view. Influenced by his reading of Marsh, the Canterbury runholder Thomas Potts, among others, put a counter-argument. The transformation of New Zealand resulted not from 'any mysterious law of nature, but ... [is] a consequence of human action'.⁶⁷

From his own observations, another runholder, Herbert Guthrie Smith, was in no doubt about human and other animals' agency. He painstakingly chronicled what he called the obliteration of a virgin landscape in the Hawkes Bay region of the North Island and its replacement, largely by his own hand, with alien plants and animals, among which he placed himself. In his preface to the first edition of *Tutira: The Story of a New Zealand Sheep Station*, published in 1921, Guthrie Smith urged his reader to 'mark, learn, and inwardly to digest the subcutaneous erosion of a countryside, the ancient way of the Maori, the fortunes of pioneer man and beast, the acclimatisation of an alien flora and fauna'.

In the wake of our sailors, explorers, soldiers, and pioneers, they steal unnoticed, unobserved. The proverbial sun that never sets on the flag, never sets on the chickweed, groundsel, dandelion and veronicas that grow in every British garden and on every British garden-path ... Following the destruction [of the ancient vegetation of the sheep-run] through man's agency by fire and stock, a huge area of virgin soil was, to use a New Zealand political term, "thrown open to selection" ... [and] a host of ancient and eager rivals rushed upon the soil. With the assistance and assent of the stock the ground was seized, not only by indigenous plants, whom we may imagine to have been for centuries eagerly waiting for expansion and jealous of their hungry foe, but by aliens brought from thousands of miles – from Europe, Asia, Australia and America; from, in fact the four quarters of the globe.⁶⁸

G. M. Thomson, a Dunedin teacher turned professional scientist, also questioned the received wisdom. Thomson considered that the isolated, large islands of New Zealand provided a unique opportunity to explore in some detail the processes and agencies involved in the introduction of a host of exotic

species. In a book put together in 1922, towards the end of his life, he said he first approached the subject from the point of view of natural selection but, from the evidence, soon came to the conclusion that other agencies were involved. He attributed the first introduction of European weed species to James Cook, who planted vegetable gardens at Dusky and Queen Charlotte Sounds in 1773. What happened to Cook's garden at Dusky intrigued him:

In 1791 Vancouver visited Dusky Sound and Lieut. Menzies reported that in the garden (made by Cook eight years previously) there had grown up a dense covering of brushwood and fern, which obliterated all sign of the old clearing ... In view of the struggle between indigenous and introduced plants which exercised the minds of many eminent naturalists, and to which reference is made in the writings of Hooker, Darwin, Wallace and others, the record of [these] further visits to Dusky Sound is interesting.⁶⁹

Thomson went on to trace the history of exotic plant introductions, through garden cultivation by itinerant whalers and sealers and the giving of European garden and agricultural seeds and plants to Maori by missionaries. He remarked on other deliberate and accidental introductions, for example in the seed stores, baggage, bedding, rubbish, ballast and packaging materials of immigrant ships.⁷⁰

He also reviewed provincial and national legislative attempts, from the 1850s onwards, to deal with many introduced animals and plants, which had 'increased at a rate that upset all calculations'. The Noxious Weeds Act of 1900, consolidated in 1908, gave some measure of control including, for the first time, reasonably effective border control. But:

The early settlers were great law-makers, but also great law breakers, for it is of no avail to make laws which cannot be kept or at least enforced, and in a great many of these restrictive ordinances Nature was too strong for the settlers and beat them very frequently.

Lamenting that, one hundred and fifty years after Cook, 'the country has not yet realised the necessity of a scientific treatment of the whole question of naturalisation', Thomson saw the way ahead lying in two directions:

... closer settlement of the land coupled with more intensive cultivation; and better education of all those concerned in the primitive [i.e., primary] industries of the country ... as to the economic waste that ensues whenever undesirable animals and plants are allowed to thrive.⁷¹

On the educational front, F. W. Hilgendorf aimed his 1926 book, *Weeds of New Zealand and How to Eradicate Them*, at farmers, students 'and that large class of people that has no special interest in weeds' but enquired about things generally. Hilgendorf, professor of agriculture at Canterbury Agricultural College, Lincoln, briefly rehearsed some of the history, origins and habits of weeds. He believed that despite a general fear in the 1850s that 'the country would be

completely overrun' by some introduced weeds like Scotch thistle, 'the virulence of the attack' of this and other weeds like foxglove and Californian thistle had, by 1926, passed.⁷²

Regarding science, it is clear from what Thomson wrote that in New Zealand understandings were changing quite rapidly, away from a purely organismic 'displacement' approach to a systemic, ecological consideration of plant naturalisations.⁷³ Among that of others, Thomson used the work of Leonard Cockayne, a pioneer New Zealand ecologist, to illustrate the point. Cockayne, a self-educated naturalist, had in 1919 tartly dismissed displacement in favour of ecological explanations.⁷⁴ Although many exotic plants:

at first sight appear better suited to the soil and climate than are the indigenous species ... this is only the case where draining, cultivation, constant burning of forest, scrub and tussock, and the grazing of a multitude of domestic animals have made absolutely new edaphic [i.e., soil, ground] conditions which approximate those of Europe and there is no wonder the European invader can replace the aboriginal.⁷⁵

In their discourse on the history of the colonial New Zealand flora, Travers, Potts, Thomson and Cockayne were using their science to try to understand the profound changes that they witnessed during their lifetimes. Some, among the rising generation of New Zealand professional scientists were, by the 1920s, considering the application of science, and particularly ecological principles, to weed control.

A short history of the investigation of biological control of weeds in New Zealand by the Cawthron Institute, published in 1970, sheds some light on a shift away from the explanatory towards what the Australian environmental historian Libby Robin has labelled 'government science', a science geared to economic development.⁷⁶ The author, D. Millar, became director of the programme in 1928. Public funding in 1926, to investigate insect control of weeds in New Zealand, followed the success of similar programmes elsewhere in the Pacific.⁷⁷ Limited though Millar's history is, in that it focuses essentially on the narrow framework of the contemporary research and its outcomes, it provides an insight into the emergence of a distinctly agronomic outlook and mode of thought, characteristic of New Zealand agricultural science from then onwards. Miller could still conclude in the late 1960s that 'the successful biological control of any weed is futile unless *something useful* [emphasis added] is grown in place of the weed'.⁷⁸

This ideology is also evident in the contributions of Miller and another New Zealand scientist to a 1940 international symposium on the control of weeds. Bruce Levy, of the grasslands division of the Plant Research Bureau, Palmerston North, advocated weed prevention by carefully balancing sward composition and density, and stock grazing to reduce weed competition and increase land productivity. 'No major work of control can be permanently effective unless the

country is at the same time effectively grazed and farmed.⁷⁹ Miller viewed the reversion of four million acres of former pasture to scrub and second growth indigenous forest, *via* infestation by noxious weeds, as an economic waste. He advocated a cultural solution to the weed problem, dependent on sound pasture and stock management. But, echoing Thomson, he said that 'owing to existing conditions, among which lack of population is prominent, cultural control cannot altogether be depended upon'.⁸⁰

In his 1973 review of the history of noxious weeds legislation in the state of Victoria, Australia, W.T. Parsons, director of the Keith Turnbull research station at Frankstown, came to much the same conclusion as Thomson and Miller about the effectiveness of legislation by itself to control weeds. The fragmented nature of Australian administration within and across state borders constituted part of the problem. Parson promoted an understanding of the ecology of weed species and the use of pasture management to control them. Parsons' comments on fragmentation are pertinent to the New Zealand situation following the relatively recent handing over of weed control to regional councils, and the emerging disparities between their localised policies and methods.⁸¹

This preoccupation with the application of public science to the control of wild nature and thus the enhancement of productivity has been a persistent theme in the New Zealand literature since World War II, virtually up to the present day. An American, A.H. Clark, who spent almost two years in New Zealand during the early years of World War II, drew attention in 1949 to infestations of North Canterbury tussock grasslands by *Nasella* tussock, an Argentinean import. No agreement had been reached on effective control methods, but the time-honoured recourse to legislation got under way just before Clark left the country in 1942. This would establish control boards, similar to rabbit boards.⁸²

Clark also saw the eradication of gorse as problematic. It could be managed where 'good husbandry' kept hedges under control. But farmers held the opinion, almost universally, that wherever gorse had spread across the wide Canterbury riverbeds, up gullies and over hill slopes, cutting and grubbing infested areas became uneconomic because of the low productivity of most of the land involved.⁸³ They held out some hope that quick-growing pines might in some locations out-compete gorse for sunlight and water. Success on any large scale required either 'a labour of love' from farmers or government assistance.

Broom posed a lesser problem, because it had not spread to anywhere near the same extent. Blackberry, which covered thousands of acres in the higher-rainfall regions of Nelson and Westland, presented a different story. Clark attributed its spread to birds eating the ripe berries. He wondered whether its introduction might have had something to do with west-country English immigrants' taste for blackberry pie and clotted cream. Biological control of gorse had met with limited success. With blackberry, it was a non-starter. The preferred parasites were 'too catholic in their tastes' to permit release without endangering the wider fruit industry.⁸⁴

In *The Western Invasions of the Pacific and its Continents* (1963), the Australian historical geographer A.G. Price picked up Clark's general theme of dogged transformations for the sake of productivity. But he took cognisance of the price of that transformation, in terms of wildly fluctuating imbalances in the new, manufactured ecosystems. Price considered (wrongly, as has been demonstrated here) that only from around 1907 did 'the New Zealanders ... see the practical results of the invasions'. Although by then New Zealand depended on exotic species for its economic prosperity, in the 1950's the country continued to face problems arising from ongoing disturbances to ecological balances. The control of rabbits, for example, had brought in its wake the rapid spread of introduced sweet brier.⁸⁵

Nevertheless an emphasis on weeds and weediness as the antithesis of productivity and prosperity continued. In a booklet published in 1949 for both popular consumption and educational use, the geographer K. B. Cumberland felt sure that 'Grass, livestock, fertilisers and enlightened farmers ... build the prosperity of New Zealand.' He contrasted pastures which 'are maintained by careful grazing and frequent topdressing with artificial fertilisers' to those:

where methods and management have been deficient [and] pasture grasses have been largely replaced or crowded out by weeds, second growth and shrubby plants of very great variety.

He did grant nature some beneficial agency. When erosion followed in the wake of forest removal from hill country weeds like gorse, bracken and manuka helped to stabilise sheet erosion and provided a nursery for forest re-growth:

It is a consolation to know that if and when man withdraws from the higher-rainfall hill country, then nature is willing to assume control again.⁸⁶

Not everyone shared Cumberland's patronising, agronomical point of view. Following a sojourn in New Zealand from 1947 to 1949, the American zoologist, ornithologist and oceanographer R. C. Murphy in 1952 set down his own and earlier perceptions of, and current views about, the relationship between people and nature in New Zealand, from pre-European times to the present.⁸⁷ He too, saw the transformation of the indigenous flora and fauna in terms of invasion and, more importantly, ecological disturbance.⁸⁸ Noting Darwin's and Hooker's mistaken conclusion that Old World plants possessed some intrinsic competitive superiority, he reiterated Thomson's and Cockayne's positions, observing that:

European plants were superior only in being dominants in a long-established man-made kind of terrain, to which much of New Zealand in turn was being rapidly converted.⁸⁹

Clearly taken aback by both the speed and scale of the transformation, and the changes that had occurred to the growth and dispersal patterns ('population explosions') of introduced species, Murphy lamented a lack of space to cata-

logue the ‘shocking effects’ upon the indigenous flora and the soil. He agreed with Cumberland on one point. Too much of the land had gone ‘down to the sea in slips’.⁹⁰ But in the same way that Americans had forgotten that their north eastern states had once been a land of wild turkeys and huge white pines, most New Zealanders were, Murphy thought, largely oblivious to what he regarded as changes for the worse. Much ‘manufactured’ grassland had reverted to scrub, through the agency of gorse and broom. Academics, educators, a very few politicians, enlightened agriculturalists and sections of the press were aware of the situation. But the lag between what the few knew and what all should know was great.⁹¹

The generally pessimistic tenor of his remarks was not altogether misplaced. In the June 1960 issue of the *New Zealand Journal of Agriculture*, which marked its fiftieth anniversary, three articles reviewed the history of weeds and attempts to deal with them.⁹²

One, by G.R. Moss, a farm advisory officer with the Department of Agriculture, dealt briefly with attempted legislative and biological controls, before moving on to consider cost-effective control measures. Moss concluded that the problem would remain ‘until every gorse hedge has been destroyed’.⁹³

Another article, by P.R. Stephens, alluded to the role of weeds in ‘man’s struggle to develop agricultural production’ from biblical times onwards. Drawing from *Journal* files, the author saw the war years, 1939–45, as a turning point in weed control in New Zealand. Failures with biological and chemical control had up to then frustrated a string of local researchers. The article concluded that the first introduction of selective organic weed sprays in 1946 had revolutionised weed control.⁹⁴

Controversial attempts to introduce central government legislation to deal with noxious weeds, beginning in 1892, were reviewed in the third article, also by Stephens. By 1910 there had been a realisation, Stephens said, that the legislation which had finally been passed in 1900, could not of itself rid the country of noxious weeds. Stephens advocated ‘careful and repeated cultivation [as] the radical exterminator’. Like Levy before him, he saw salvation from pasture weeds such as Californian thistle coming in the form of competition from stronger-growing grass species.⁹⁵

An ironic twist to the tale of post-war weed control came within a few years. In the late 1970s Cumberland, by then professor emeritus at Auckland University, put together a televised series, *Landmarks*, on human-induced landscape changes in New Zealand, with an accompanying book. The language of agronomy and the imagery of conflict, crusade and battle pervaded his salvational account of the relationship between people and other introduced species:

Nature exacts its revenge. Haphazard introduction of alien animals and plants had unforeseen and often disastrous effects. Man’s fleeting hold was threatened as the

land lost its fruitfulness or the soil slipped away. Lessons were learned the hard way – and only just in time.

But, and for Cumberland it was a very big ‘but’, he worried that if weed-killers like 2-4-5-T (the Agent Orange of Vietnam, used on gorse in New Zealand) were withdrawn due to mounting concerns about their effects on people, the implications for farm productivity could be ‘profound’.⁹⁶

Two other accounts of problems associated with New Zealand weeds, published in the early 1980s, stand in some contrast to Cumberland’s position. A. Rahman attributed the introduction of most arable weeds to seed impurities and farm machinery. He foresaw a greater use of selective weed killers but unlike Cumberland, regarded this as a mere panacea. The outcome would be simply a ‘continuing and faster change of the weed flora of arable land’. L. J. Matthews was equally explicit. He noted that there were no endemic weeds of improved pastures in New Zealand.⁹⁷ ‘Mankind must accept full responsibility for present-day problems.’ The agronomic doctrine that management of grazing animals alone would control pasture weeds had ‘over-coloured’ thinking to the extent that ‘a paucity of knowledge still governs many weed control practices’. It could be demonstrated that weeds were to be found in New Zealand pastures as a direct result of excessive control pressures. He took the position that ‘each and every agricultural practice develops its own set of weed problems’. He advocated a better knowledge and application of weed ecology including, in some cases, the complete withdrawal of all control measures.⁹⁸

Writing in 1981, B. E. V. Parham of the botany division of the Department of Scientific and Industrial Research, Lincoln, thought otherwise. In New Zealand, ‘no form of land use can be undertaken without adequate provision for their control, however difficult and expensive’.⁹⁹ By the end of the 1980s, however, control regardless of cost came under closer scrutiny. R. J. Field, professor, and G. T. Daly, reader of plant science at Lincoln University, Canterbury, separated ‘control’ into three categories – eradication, prophylaxis and containment. Using an economic and ‘cosmetic’ threshold model they, like Matthews, took the view that in those cases where numbers fall below a threshold level, determined by a farm-based cost–benefit analysis, then weeds should be tolerated.¹⁰⁰

CONCLUSION

So, these are some of the ways people have conceptualised and written about their relationships with a specific part of nature, which we in the English-speaking West have come to call weeds. However obscure the etymological roots of our name for a group of plants with which we continue to compete and still seek in some measure to control, it is possible to discern, through the various literatures, the varieties of Otherness in which we have cast them.

The Neolithic monocultures that transformed the ecosystems of the Near East were the seedbeds of a conceptual transition about the relationship between people and their floral competitors. This transition found expression in, among other places, the tribal stories that became the literature of the Old Testament. Genesis 2 and 3 explained not only the 'how' but also the 'why' of the tribulations experienced by an agricultural society in an unforgiving environment.¹⁰¹

Reinforced by Greco-Roman traditions of lost innocence and Arcadian places, the retributive and antipathetic symbolisms of weediness passed into the New Testament. From the Parables, weeds took on a moral as well as a theological Otherness. Both were re-emphasised by the new exegeses of the post Reformation years and flowed into the language and imagery of secular affairs. They coloured not only the literature of Shakespearean England but, as van der Zweep has shown, much of that of middle and western Europe.¹⁰²

In the world of the natural theologians, weeds as part of Nature reflected a purposeful Deity, one, which, moreover, looked kindly upon a self-improving humanity. Weeds became part and parcel of the Halesian imperative to subjugate Nature in the raw, the elimination of their Otherness being held up as a mark of moral rectitude, or at least good husbandry.

In the Enlightened Old and New Worlds, some were not so sure. With weediness, reason seemed often to fly in the face of received wisdom. For some, weeds regained their former utility, retaining something of their moral purposefulness. For others like the apothecaries, morality was subsumed by practicality. For some of the botanists, there never had been Otherness.

And as urban humanity moved away from Nature in the raw, aesthetic and poetical considerations gave weeds yet another hue. Otherness became romanticised. At the same time, the new, positivist science and the newer geography occasioned a quite different rethinking of the nature–humanity relationship, one that came down, increasingly, on the side of Nature. With growing clarity, it came to be seen that weediness is not intrinsic, not a category of nature. Whatever Otherness weeds may possess, it is an outcome of human artifice.

Weeds exercised the minds of the Antipodean settler-scientists, their professional successors and their politicians. In New Zealand the public discourse has been constructed around quite disparate scientific, geographic and historical-geographic positions. Initially it centred on ideas about the role of 'natural laws' *versus* human agency. More recently fairly narrow notions of agricultural productivity within a strictly agronomic context have come up against much wider perceptions and expressions of disquiet, largely articulated by historical geographers, about the directions and practical outcomes of the discourse. A very few, like G. M. Thomson, Leonard Cockayne and Gordon Ell, sought to understand weediness and the success or failure of human responses in historical and cultural as well as scientific terms. They brought new insights into a

relationship that had been intuitively understood by people like John Lorain in eighteenth-century America and Thomas Potts in nineteenth-century New Zealand – that humans and weeds had long been competing for the same places, and that human monocultures had long advantaged the weeds.

Some twentieth-century sciences have, however, been intent not only on understanding the natural world but also on providing measures to subdue or improve it in a way that would have been understood by a sixteenth-century divine like Matthew Hale. The poisoning, however, of both places and people has, in some parts of the Western world, brought the relationship and the age-old competition for open places once again into sharp relief. Gradually, though hardly universally, there seems to be a shift in focus, from controlling the invader by whatever means to managing invaded ecosystems. Recent advocacy for the conservation of biodiversity by changing human behaviours with regard to plant introductions and use, land uses and the management of control measures would have appealed to Leonard Cockayne and his pioneering ecologist colleagues.¹⁰³

With the striking exception of Frieda Knobloch's chapter about weeds in her 1996 book *The Culture of Wilderness*,¹⁰⁴ the discourse surveyed here has by and large been written by men, about men. In New Zealand, as elsewhere in the Western world, women's plants have been largely confined to garden culture. Wider aspects of women's cultures are, for example, tantalisingly hinted at in Ell's wildflowers and garden escapees. What might the historical record yield up to closer scrutiny?

It is a discourse of some breadth, but no great depth. Its existence, particularly in New Zealand, is due largely to disparate authors, other than historians. It is, moreover, an historiography that begs the question, why has the relationship between weeds, people and the places they contest, a contest that has gone on for something like ten millennia, been treated, as it were, only in passing? These and other questions about a remarkable inter-species relationship invite answers from environmental historians interested in a societal contest that shows no signs of abating.

GLOSSARY

Botanical nomenclature tends to vary from author to author and over time. To maintain some consistency with the sources, wherever possible the nomenclature used by authors such as Salisbury (1961) and Rackham (1986) has been replicated below. The particular nomenclature followed by an author is usually stated in her or his Preface or Introduction. In those instances where a botanical name is not given by any author cited, Hilgendorf (6th edition, 1960) has been used.

Barberry

Berberis vulgaris

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Blackberry	<i>Rubus fruticosus</i> , <i>R. laciniatus</i> (Hilgendorf)
Bramble	<i>Rubus fruticosus</i>
Briar	<i>Rosa</i> spp. In New Zealand, usually <i>R. eglantaria</i>
Broom	<i>Cytisus (Sarthamnus) scoparius</i>
Californian Thistle	<i>Cirsium arvense</i> (Hilg.) Also known as Canadian thistle. Actually a native of Europe.
Campion	<i>Silene</i> spp.
Charlock (Wild turnip)	<i>Sinapis arvensis</i>
Darnel	<i>Lolium temulentum</i>
Dock	<i>Rumex</i> spp.
Dodder	<i>Cuscuta epithymum</i>
Fennel	<i>Foeniculum vulgare</i>
Fern (Bracken)	<i>Pteridium esculentum</i>
Foxglove	<i>Digitalis purpurea</i> (Hilg.)
Fumitory	<i>Fumaria officinalis</i> and <i>F. muralis</i>
Golden Thistle	<i>Scolymus hispanicus</i>
Goosefoot (Fat Hen)	<i>Chenopodium album</i>
Gorse (Furze, Whin)	<i>Ulex europeus</i>
Ground Elder	<i>Aegopodium podagraria</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Vetch	<i>Vicia hirsuta</i>
Hard Rush	<i>Juncus inflexus</i>
Heather	<i>Calluna vulgaris</i> . See also <i>Erica</i> spp.
Hemlock	<i>Conium maculatum</i>
Horsetail	<i>Equisetum arvense</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Manuka	<i>Leptospermum scoparium</i>
Nasella Tussock	<i>Nasella trichotoma</i> (Hilg.)
Nettle	<i>Urtica dioica</i> and <i>U. urens</i>
Persicaria (redshank, knot weed, lady's thumb, willow weed)	<i>Polygonum persicaria</i>
Poppy	<i>Papaver rhoeas</i>
Ragwort	<i>Senecio jacobaea</i>
Rush	<i>Juncus</i> spp.
Sea plantain	<i>Plantago maritima</i>
Scentless mayweed	<i>Matricaria indora</i> ,
St. John's Wort	<i>Hypericum perforatum</i>
Scabious	<i>Scabiosa columbaria</i>
Scotch Thistle	<i>Cirsium lanceolatum</i> (Hilg.)
Stinking Mayweed	<i>Anthemis cotula</i>
Thistles	One or other of <i>Carduus</i> , <i>Carlina</i> , <i>Centaurea</i> , <i>Cirsium</i> , <i>Onopordon</i> or <i>Silybum</i> spp.

Thorny Burnet	<i>Sarcopoterium spinosum</i>
Willow-herb	<i>Epilobium</i> spp.
Woad	<i>Isatis tinctoria</i>
Yarrow	<i>Achillea millefolium</i>

NOTES

This article began in a small way as an Honours research paper. That it appears here is due entirely to the gentle persuasion of my doctoral supervisors, Associate Professors Judy Bennett and Tom Brooking of the History Department, University of Otago. They eventually convinced me it was worth publishing and have subsequently guided and encouraged its various iterations. The initial inspiration came from Professor Tom Isern, North Dakota State University, who observed, in the course of a study visit to New Zealand, that quite a lot is understood about the history of Antipodean faunal invasions but little about the floral.

¹ Cited in W. van der Zweep, 'Golden words and wisdom about weeds – weeds in proverbs, quotations verse and prose', *Biology and Ecology of Weeds*, ed. W. Holzner and M. Numata (The Hague: Junk, 1982), 62. Van der Zweep comments that 'Weed scientists had better consider this a dissonance in their public relations.'

² 'Young' is used here in terms of length of European occupation. Geologically New Zealand is old, a remnant of Gondwanaland. As we shall see, that age is reflected in the nature of its indigenous flora.

³ Leonard Cockayne, *New Zealand Plants and Their Story*, 2nd edition (Wellington: Government Printer, 1919), 145, 146.

⁴ I am indebted to Associate Professor Judith Bennett, of the History Department, University of Otago, who drew my attention to Greg Bankoff's paper 'Societies in Conflict: Algae and Humanity in the Philippines', in *Environment and History* 5, 1 (1999): 97–123. I share Bankoff's critical view that among most historians there is 'an implicit assumption that humanity stands at the apex of life on this planet'.

⁵ Two ideas which have developed some currency in recent years, biodiversity and ecofeminism, may not appear to have been given their due in this essay. With one or two exceptions they are not strongly reflected in the discourse cited here. An essay such as this, however, is by no means exhaustive. Much may have been overlooked in my reading.

⁶ C. J. Glacken, *Traces on the Rhodian Shore, Nature and Culture in Western Thought From Ancient Times to the end of the Eighteenth Century* (Berkeley: University Of California, 1967, reprinted 1990), 317.

⁷ F. Uekoetter, 'Confronting the pitfalls of Environmental History: An Argument for an Organisational Approach'. *Environment and History* 4 (1998): 31–52.

⁸ There is, in addition to the few examples cited here, a large, relatively recent and expanding North American literature touching upon various aspects of the history of the humans–weeds relationship. It is a literature that wants surveying in its own right, beginning perhaps with Alfred Crosby's *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986).

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⁹ F. Knobloch, *The Culture of Wilderness, Agriculture as Colonization in the American West* (Chapel Hill: North Carolina University Press, 1996): 114–15. ‘Not weeds’ is Knobloch’s term.

¹⁰ M. Pollan, ‘Weeds Are Us’, in *Second Nature: A Gardener’s Education* (New York: Dell, 1991), 116. One-liners abound in both scholarly and popular accounts of weeds. Emerson’s, ‘A weed is simply a plant whose virtues we haven’t yet discovered’, is cited by Pollan.

¹¹ L.J. King, ‘Some early forms of the weed concept’, in *Nature*, 179 (1957), 1366; King, *Weeds of the World, Biology and Control* (London and New York: Hill, 1966), 1–6.

¹² For a derivation of the term ‘weed’ see *The New Shorter Oxford English Dictionary* (Oxford: Clarendon Press, 1993), v. 2, 3648. King, *Weeds of the World*, 5, observed that in 1958 A. A. Lawrence of the Dictionary’s editorial staff disagreed with this theory. King conceded that a philological approach could yield only a tentative connection between the modern term and the ubiquity of woad which, with very few exceptions, has not itself been generally classed as a weed. He commented that perhaps the botanical evidence was more compelling than the etymological. To conserve space in the text, common names for plants are used throughout. A glossary of botanical names is appended to this essay.

¹³ King, *Weeds of the World*, 5.

¹⁴ King, *Weeds of the World*, 8–9.

¹⁵ Sir Edward Salisbury, *Weeds and Aliens* (London: Collins, 1961), 18.

¹⁶ Salisbury, *Weeds and Aliens*, 82–3. Other plants, introduced into environments at or near their climatic tolerances, and which tend to be localised or rare, he classed as ‘casual aliens’. An American ecologist Marcel Rejmánek, has separated weeds from ‘invaders’ and ‘colonisers’. These, he says, reflect three different points of view: anthropocentric (weeds being plants growing where they are not wanted), ecological (colonisers appear early in plant successions) and bio-geographical (invaders spread into areas where they are not native). See ‘What Makes a Species Invasive?’ in *Plant Invasions, General Aspects and Special Problems*, P. Pyaek, K. Prach, M. Rejmánek and M. Wade, eds. (Amsterdam: SPB Academic Publishing, 1995), 3. All three aspects of ‘weediness’ are considered here.

¹⁷ Salisbury, *Weeds and Aliens*, 30, 33, 206, 228, 274. His discussion of these aspects of weediness is, however, incidental, unsystematic and fragmentary.

¹⁸ That may no longer be the case, but subsequent scholarship on the question, if there is any, has not emerged in the course of this survey.

¹⁹ Salisbury, *Weeds and Aliens*, 24–9.

²⁰ Salisbury, *Weeds and Aliens*, 23.

²¹ D. Worster, to the conference of the American Society for Environmental History, cited by M. Egan <michaele@sfu.ca> in ‘The Future of Environmental History’, contribution to H – NET List, <H-ASEH@H-NET.MSU.EDU>, 27 April 1999.

²² C. S Elton, *The Ecology of Invasions by Animals and Plants* (London: Methuen, 1958), 117–18, Ch. 9, *passim*.

²³ O. Rackham, *The History of the Countryside – The Full Fascinating Story of Britain’s Landscape* (London: Dent, 1986), xiii, 53.

²⁴ Rackham, *The History of the Countryside*, 53–4. Edward Hyams, *The Story of England’s Flora* (Harmondsworth: Penguin, 1979), *passim*, provides an insight into the exotic origins and the history of the introduction into England of many species which have come to be thought of as indigenous to that country.

²⁵ 'The Herbarium of Apuleius', 11th century, in J. de Gex, *A Medieval Herbarium* (London: Pavilion Books, 1995), 22.

²⁶ de Gex, *A Medieval Herbarium*, 16. For a modern treatment of the history of those weeds considered to have curative properties, see P. Jones, *Just Weeds, History, Myths, and Uses* (New York: Prentice Hall, 1991).

²⁷ *Hamlet*, Act I, Scene ii. All quotations are from B. Hodek, ed., *The Complete Works of Shakespeare* (London: Spring Books, n.d.).

²⁸ Pollan, *Second Nature*, 118.

²⁹ *Henry IV, Part 1*, I. iii.

³⁰ Cited in Salisbury, *Weeds and Aliens*, 32–3, 146–7. Salisbury gives FitzHerbert as John in his text and A. in his index.

³¹ Virgil, Eclogue IV, cited in R. Williams, *The Country and the City* (London: Oxford University Press, 1973), Ch. 3 *passim*.

³² W. E. Shewell-Cooper, *Plants and Fruits of the Bible* (London: Darton, Longman and Todd, 1962), 145–8.

³³ *The New International Version Study Bible* (Michigan: Zondervan, 1984), 1462.

³⁴ M. Zohary, *Plants of the Bible* (Cambridge: Cambridge University Press, 1982), 9, 12–14, 153. Zohary notes that local renderings (Greek, Latin, Aramaic, Syric and so on) of Biblical weed and plant names, often quite unrelated to the Hebrew or Arabic originals, can be attributed to a lack of knowledge of Hebrew floral terminology among translators, from the Septuagint (third century BC) to the present. The same plant, for example, can in English become briar, bramble, thorn and thistle. Something of the significance of the parable is therefore lost in the looseness of the translation. Rackham, p. 23, has made the same general point in relation to the use of translations from Latin, Old English and Norman French as historical sources. Not only do translators misread their texts, but 'guess at the meanings of unknown technical terms or fail to uphold distinctions of meaning'. The 'weeds' in the Parable of Weeds are, according to Zohary, either darnel or Syrian scabious or both. Both plants were difficult to remove from a wheat crop. Both impart a bitterness to flour, while darnel can also harbour a poisonous fungus. Shakespearean England knew it well. 'Want ye corn for bread? 'tis full of Darnel; do ye like the taste?' *Henry VI*, cited in Salisbury, *Weeds and Aliens*, 33.

³⁵ Zohary, *Plants of the Bible*, 153–67. Zohary uses the Revised Standard Version, 1973, throughout. Luke 6:45, added here in parenthesis, is from the *NIV Study Bible*. The bramble in Solomon is probably Golden Thistle. Zohary gives that in Luke 6:44 as *Rubus sanguineus*. For the way in which biblical images of weediness have passed into Western folk culture and literature, see van der Zweep in *Biology and ecology of weeds, passim*.

³⁶ A. Neckam, *De naturis rerum*, ed. T. Wright, London, 1963, cited in Glacken, *Traces on the Rhodian Shore*, 206.

³⁷ Keith Thomas, *Man and the Natural World, Changing Attitudes in England 1500–1800* (London: Allen Lane, 1983), 17.

³⁸ Glacken, *Traces on the Rhodian Shore*, 57–8, 157, 164–5.

³⁹ William Cole, *The Art of Simples*, 1656, 93, cited in Thomas, *Man and the Natural World*, 19–20. Cole classified weeds as one of seven different kinds of herbs, along with potherbs, medicinal herbs, corn, pulse, flowers and grass. For a discussion of John Ray, see N.C. Gillespie, 'Natural History, Natural Theology and Social Order: John Ray and the "Newtonian Ideology"', *Journal of the History of Biology*, 20 (1997), 1–49.

⁴⁰ Sir Matthew Hale, *The Primitive Organisation of Mankind*, 1667, 369–70, cited in Glacken, *Traces on the Rhodian Shore*, 481.

⁴¹ Thomas, *Man and the Natural World* 1983, 17.

⁴² Hale, *The Primitive Organisation of Mankind*, 369–70; Thomas Sprat, *History of the Royal Society*, n.d., 119–121, 386. Both are cited in Glacken, *Traces on the Rhodian Shore*, 480–2. Dr Sprat was Lord Bishop of Rochester.

⁴³ Thomas, *Man and the Natural World*, 272. The anonymous composer of the traditional Scottish air ‘The Broom o’ the Cowdenowes’ did not altogether share his countryman’s view about the ‘bonnie, bonnie broom’. See J.M. Diack, *The New Scottish Orpheus*, Glasgow, c.1922, 32–3 for score and lyrics and Silly Wizard, *Live Wizardry, The Best of Silly Wizard in Concert*, Green Linnet Inc, CD3036/37, 1988, track 13, for a recent rendition. I am grateful to Dr Alison Clarke, Hocken Library, University of Otago, for drawing my attention to this musical celebration of one of the ‘weedy’ flora.

⁴⁴ Each is cited in Thomas, *Man and the Natural World*, 270–2. Blith seems to have been something of a super-improver. He published *The English Improver Improved* in 1649. Sharrock, Archdeacon of Winchester Cathedral, published *The History of the Propagation and Improvement of Vegetables by the Concurrence of Art and Nature* in 1660.

⁴⁵ G.W. Francis, *The Little English Flora*, 1839, 111–12, cited in Thomas, *Man and the Natural World*, 272.

⁴⁶ J. von Goethe, ‘An Attempt to Evolve a General Comparative Theory’, in *Goethe’s Botanical Writings*, trans. Bertha Mueller, 81–4, cited in Glacken, *Traces on the Rhodian Shore*, 535–6.

⁴⁷ J. Lorain, *Nature and Reason Harmonized in the Practice of Husbandry*, Philadelphia, 1825, 27, cited in Glacken, *Traces on the Rhodian Shore*, 693–695.

⁴⁸ Lorain, *Nature and Reason Harmonized*, 518, cited in Glacken, *Traces on the Rhodian Shore*, 695–6.

⁴⁹ W. Cowper, *The Task*, lines 526–30; J. W. Tibble, ed., *The Poems of John Clare*, 1935; E. T. Cook and A. Wedderburn, *The Works of John Ruskin*, 1903–1912; A.T. Tait, *The Landscape Garden in Scotland*, Edinburgh, 1980. Each is cited in Thomas, *Man and the Natural World*, 272. Thomas observes, in a text note, 272, that ‘to the reformer H.S. Salt a garden was merely “a zoo with the cruelty omitted”’.

⁵⁰ *The Journal of Henry David Thoreau*, B. Torrey and F. Allen, eds., New York, 1962, cited in W. Cronon, *Changes in the Land – Indians, Colonists and the Ecology of New England* (New York: Hill and Wang) 1983, 1–6.

⁵¹ Raynal, *Histoire Philosophique et Politique des Etablissements et du Commerce des Européens dans les deux Indes* cited in Glacken, *Traces on the Rhodian Shore*, 682–3. Glacken comments, 663, that Buffon’s ideas about man the improver in many ways anticipated George Perkins Marsh.

⁵² B. Rush, ‘An Enquiry into the Cause of the Increase of Bilious and Intermitting Fevers in Pennsylvania, with Hints of Preventing Them’, *Transaction of the American Philosophical Society*, 2, 25 (1786) 206–12, cited in Glacken, *Traces on the Rhodian Shore*, 688.

⁵³ J. Eliot, undated letter in his *Essays upon Field Husbandry in New England and Other Papers, 1748–62*, ed. H.J. Carmen and R.G. Ingwell, New York, 1934, 96–7, cited in Glacken, *Traces on the Rhodian Shore*, 692–3.

⁵⁴ J. Bartram, in *Essays upon Field Husbandry in New England and Other Papers*, 203–4, cited in Glacken, *Traces on the Rhodian Shore*, 691. Bartram’s early interest in things botanical is referred to by Hyams, *The Story of England’s Flora*, 101.

⁵⁵ E. Johnson, *Johnson's Wonder-Working Providence*, J. Jameson, ed., New York, 1910; B. Rush, *Essays, Literary, Moral and Philosophical*, 2nd edn., Philadelphia, 1806, cited in Cronon, *Changes in the Land*, 1–6.

⁵⁶ T. Dwight, *Travels in New England and New York*, B. Solomon, ed., Cambridge Mass., 1969. Dwight, was realist enough to believe that it was 'altogether improbable' that barberry would ever be eradicated. He and Thomas Hutchinson are cited in Cronon, *Changes in the Land*, 155. Cronon does not give a source for Hutchinson. Rackham, *The History of the Countryside*, 42–3, cites moralists who, in the Age of Reason, dismissed the prejudice of farmers against barberry as an example of superstition. He quotes from W. Ellis, *The Timber-Tree Improved*, London, 1744:

This Tree has an ill Name for attracting Blights to the Corn that grows near it an ignorant malicious Farmer of *Frethesden* about the year 1720 conceived such a Hatred against a large one, that grew in his Neighbour's Ground, that he poured several Pails of scalding Water on its Roots, in the Night-season, at different Times, 'till he killed it.

⁵⁷ 'Man' is used here in the same non-gendered sense as Marsh used the term.

⁵⁸ G. P. Marsh, *Man and Nature, or Physical Geography as Modified by Human Action*, ed. D. Lowenthal (Cambridge: Harvard University Press, 1965), 61 and n. 18; 62 and n. 23; 63. This is in some contrast to the central thesis of *Man and Nature*, which eschewed environmental determinism in favour of an examination of man's effect on nature.

⁵⁹ Marsh, *Man and Nature*, 61 and n. 19; 65, 66. Rackham, in his discussion of historical methods and evidence, *The History of the Countryside*, 7, also comments on this aspect of the relationship, insofar as weed pollens may be the only remaining indicators of early agriculture. Similarly, some palaeobotanists point to an increase in weeds associated with cultivation, as markers of particular historical episodes. See, for example P. Hunter Blair, *An Introduction to Anglo-Saxon England*, 2nd edition (Cambridge: Cambridge University Press, 1977), 272 and n. 1, in relation to the Roman occupation.

⁶⁰ For an earlier expression of his views on civilisation and progress see G. P. Marsh, *Address Delivered Before the Agricultural Society of Rutland County*, 30 September 1847, Published by Request of the Society, Rutland, Vermont, Library of Congress, Washington D. C., S532.M36, 1. Marsh gave this address during his first term in the US Congress.

⁶¹ Marsh, *Address*, 17–18.

⁶² 'Marsh, George Perkins', *Britannica Online*, <<http://www.eb.com:180/cgi-bin/g?DocF=micro/378/4.html>> [Accessed 20 May 1999]; K.A. Olwig, 'Historical geography and the society/nature "problematic": the perspective of J.F. Schouw, G. P. Marsh and E. Reclus' in *Journal of Historical Geography*, 6, 1 (1980), 29–45, esp. 36–9; Marsh, *Man and Nature*, 13, 19.

⁶³ The extent to which European and North American traditions of thought shaped the settler view in New Zealand is one of the questions I explore in my doctoral thesis, 'New Zealanders and their Weeds, 1770–1970', University of Otago, New Zealand, in progress.

⁶⁴ T. Flannery, *The Future Eaters* (Chatswood, New South Wales: Reed, 1995) Ch 8, *passim*, and especially 303–306.

⁶⁵ G. Ell, *Introduced Wildflowers, New Zealand Weeds* (Auckland: Bush Press, 1983) 12, 14, 15, 21, 24, 25.

⁶⁶ For their respective positions on displacement of indigenous by exotic species see G. M. Thomson, *The Naturalisation of Animals and Plants in New Zealand* (London: Cambridge University Press, 1922), 526–7.

⁶⁷ R. Galbreath, *Walter Buller – The Reluctant Conservationist* (Wellington: GP Books, 1989), 121–2. For an argument in support of displacement see, for example, T. Kirk, ‘Displacement of Species in New Zealand’, *Transactions of the New Zealand Institute*, 28 (1895), 1–27 and *New Zealand Parliamentary Debates*, 31 July 1874, 351, c.1; G. Wynn, ‘Conservation and Society in Late Nineteenth Century New Zealand’, *New Zealand Journal of History*, 11:2 (1977), 124–136, and esp. 133. Wynn has argued that Potts’ parliamentary and popular advocacy of policies based on Marsh’s arguments had only a small degree of support. It came, he says, essentially from among those immigrants from the middle and upper ranks of British society who interested themselves in post-Darwinian natural history.

⁶⁸ H. Guthrie-Smith, *Tutira: The Story of A New Zealand Sheep Station* (Auckland: Random House, 1999), 236. See especially Chapters 26–35. This edition carries a forward by William Cronon, who was instrumental in having what has come to be widely regarded as a classic in the field of environmental history, republished in New Zealand and the United States after it had been out of print for some thirty years.

⁶⁹ Thomson, *The Naturalisation of Animals and Plants in New Zealand*, 16.

⁷⁰ Thomson, *The Naturalisation of Animals and Plants in New Zealand*, 17–21, 363.

⁷¹ Thomson, *The Naturalisation of Animals and Plants in New Zealand*, 22–3, 543–4, 552, 554–5

⁷² F. W. Hilgendorf, *Weeds of New Zealand and How to Eradicate Them* (Christchurch: Whitcombe and Tombs, 1926), iii, 1–14; 6th edition, 1960, Ch. 7 *passim*. He attributed this supposed loss of vigour over time to toxins secreted into the soil by the weeds themselves. The idea of gradual loss of vigour seems to have been first introduced to New Zealand science by a Swedish naturalist, Dr. Berggren, during a discussion of G. M. Thomson’s paper ‘On some Naturalised Plants of Otago’, presented to the Otago Institute in 1873. See *Proceedings of the Otago Institute*, 6 (1873), 444, 446.

⁷³ L. Robin, ‘Ecology: A Science of Empire’, in *Ecology and Empire, Environmental History of the Settler Societies*, T. Griffiths and L. Robin, eds. (Edinburgh: Keele University Press, 1997), 63–75. Robin discusses the origins of ecological science and argues that it is an outcome of the science of settling. To what extent Thomson’s own understandings were by 1922 grounded in this relatively new science is not clear. He appears to have had at least an intuitive understanding of the explanatory power of ecosystems, although Marsh seems to have remained a stronger influence.

⁷⁴ See *The Dictionary of New Zealand Biography* (Wellington: Auckland University Press, 1990), 3, 109 for an assessment of Cockayne’s contribution to New Zealand science. H.H. Allan, director of the Botany Division, Plant Research Bureau of the Department of Scientific and Industrial Research, Wellington, thought it necessary, as late as 1940, to support Thomson’s and Cockayne’s position on ‘the still all too prevalent views as to the relative aggressiveness of the introduced and the indigenous species’. See H.H. Allan, *A Handbook of the Naturalized Flora of New Zealand* (Wellington: Botany Division, DSIR, 1940), 9.

⁷⁵ Thomson, *The Naturalisation of Animals and Plants in New Zealand*, 528–34; L. Cockayne, ‘Observations concerning Evolution, derived from ecological studies in New Zealand’, *Transactions of the New Zealand Institute*, 44 (1911), 32. Cockayne hammered the point home in two later books, *New Zealand Plants and their Story* (Wellington: Government Printer, 1919), Ch. 10 *passim*, and *The Vegetation of New Zealand* (Leipzig: Engelmann, 1928), 355–62. From the heavy emphasis in the text of the latter it would

appear Cockayne was by then thoroughly exasperated by any remaining proponents of displacement theory.

⁷⁶ Robin, *Ecology and Empire*, 65.

⁷⁷ D. Miller, *Biological Control of Weeds in New Zealand, 1927–1948* (Wellington: DSIR, 1970), 5. Miller, formerly the director of the Cawthron Institute and of the entomology division of the New Zealand Department of Scientific and Industrial Research (DSIR), was seconded by that organisation to compile the history from available records.

⁷⁸ Miller, *Biological Control of Weeds in New Zealand*, 7.

⁷⁹ E. B. Levy, 'Pasture Weeds – Their Ecological Relationship to the Pasture Sward', in *The Control of Weeds, a symposium on the prevention and eradication of weeds on agricultural land by cultural, chemical and biological means*, ed. R. O. Whyte (Aberystwyth: Imperial Bureau of Pastures and Forage Crops, 1940), 144–52.

⁸⁰ D. Miller, 'Biological Control of Noxious Weeds of New Zealand', in *The Control of Weeds, a symposium on the prevention and eradication of weeds on agricultural land by cultural, chemical and biological means*, ed. R.O. Whyte (Aberystwyth: Imperial Bureau of Pastures and Forage Crops, 1940), 153–7.

⁸¹ W.T. Parsons, *Noxious Weeds of Victoria* (Melbourne: Inkata Press, 1973), v-20. I thank Dr. Graeme Parmenter, Invermay Agriculture Centre, Dunedin, for providing a copy of Parsons' material on noxious weeds legislation. See also 'Staff Recommending Reports Evaluating Submissions on the Pest Management Strategies for Otago', *Proposed Pest Management Strategy for Otago* (Dunedin: Otago Regional Council, 2000), 2, 34. Environment Southland (another regional council, bordering the Otago region) expressed concern about inconsistencies between weed control programmes for the two regions. The Southland council took the view that pests knew no boundaries.

⁸² A. H. Clark, *The Invasion of New Zealand by People, Plants and Animals, South Island* (New Brunswick: Rutgers University Press, 1949), 349, footnote.

⁸³ This view seems to have been shared by Canterbury high country pastoralists. At Lake Heron Station, according to one of those involved with running the station in 1942, desultory attempts were made to grub out stands of gorse only if there was nothing more compelling to do. A.M. Patterson, Highcliff Road, Dunedin, personal communication, July 1999.

⁸⁴ Clark, *The Invasion of New Zealand*, 362–5.

⁸⁵ A.G. Price, *The Western Invasions of the Pacific and its Continents, A Study of Moving Frontiers and Changing Landscapes, 1513–1958* (Oxford: Clarendon Press, 1963), 197–201.

⁸⁶ K. B. Cumberland, *This is New Zealand, A Pictorial Description* (Christchurch: Whitcombe and Tombs, 1949), 17, 22–3.

⁸⁷ R.C. Murphy, 'Man and Nature in New Zealand', *New Zealand Geographer*, 8:1 (1952), 1–14. The article first appeared in the *Proceedings of the American Philosophical Society*, 59:6 (1951), 569–82. I am grateful to Roy Goodman, the society's assistant librarian and curator of printed materials, who supplied background material on Murphy's life and work, including the period he was in New Zealand.

⁸⁸ Murphy also thought in terms of ecological climax, rather than continuum, a position that inevitably coloured his conclusions. As well, some of his statements, for instance those about moa extinctions, are contrary to evidence that should have been available to him at the time.

⁸⁹ Murphy, 'Man and Nature in New Zealand', 5.

⁹⁰ Murphy was referring, 12, to *Down to the Sea in Slips*, a booklet written by A. D. Campbell in 1946 for the New Zealand Soil Conservation and Rivers Control Council. He implies, mistakenly, that Cumberland wrote it.

⁹¹ Murphy, 'Man and Nature in New Zealand', 7–14.

⁹² Although there have been frequent articles about weeds in the *Journal* over the years, these appear to be the only three which consider the historical background to the problem.

⁹³ G.R. Moss, 'Gorse, A Weed Problem on thousands of Acres of Farmland', *New Zealand Journal of Agriculture*, 100, 6 (1960), 561–7.

⁹⁴ P.R. Stephens, 'Weed Control', *New Zealand Journal of Agriculture*, 100:6 (1960), 581. One researcher, A.H. Cockayne, Leonard's only son, had in 1913 reiterated his father's view that the ecological mechanism of weed spread must be understood if control measures were to have a chance of success. Nobody in New Zealand seemed to pay much heed.

⁹⁵ P.R. Stephens, 'Noxious Weeds', *New Zealand Journal of Agriculture*, 100, 6 (1960), 613, 615.

⁹⁶ K. B. Cumberland, *Landmarks* (Reader's Digest: Surry Hills, 1981), 6–7, 178–81, 188–91. Cumberland added emphasis with a rather lurid illustration of a weed-spraying helicopter swooping low across a gorse-covered hillside. Television New Zealand produced and broadcast the television series of the same name.

⁹⁷ This may be compared with the problems Australian farmers faced with endemic weeds. See W. Frost, 'European Farming, Australian Pests: Agricultural Settlement and Environmental Disruption in Australia, 1800–1920', *Environment and History*, 4 (1998), 129–43.

⁹⁸ Rahman, A., 'New Zealand', and L.J. Matthews, 'Pasture weeds in New Zealand', in *Biology and Ecology of Weeds*, ed. W. Holzner and N. Numata (The Hague: Junk, 1982), 299–308. Rahman was then a scientist at the Ruakura soil and plant research station, Hamilton. Matthews was with the Plant Protection Service of the FAO in Italy.

⁹⁹ B.E.V. Parham, *Common Weeds in New Zealand* (Wellington: Government Printer, 1981), 9–11.

¹⁰⁰ R. J. Field and G.T. Daly, 'Weed Biology and Management' in *Pastures, their Ecology and Management*, ed. R.H.M. Langer (Auckland: Oxford University Press, 1990), 409–447. For the time being, that would appear to be a position somewhat in advance of most Regional Councils which, under current New Zealand legislation, are charged with developing and enforcing weed control policies.

¹⁰¹ For a discussion of the etiological nature of Genesis, see L. Boadt, *Reading the Old Testament, an Introduction* (New York: Paulist Press, 1984), Ch. 6 *passim*.

¹⁰² See Note 1.

¹⁰³ For a discussion of this, see 'An Integrated Approach to the Ecology and Management of Plant Invasions', *Conservation Biology* 9, 4 (1995), 761–70.

¹⁰⁴ See Note 9.