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# HORTICULTURE IN NEW ZEALAND

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# HORTICULTURE IN NEW ZEALAND

JOURNAL OF THE ROYAL NEW ZEALAND INSTITUTE  
OF HORTICULTURE (INC.)

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### Cover Picture:

Flowers of female vine of *Actinidia eriantha* Benth. This species is closely related to the kiwifruit, *Actinidia deliciosa*. It is notable for the white hairs which cover the stems, leaves, buds and fruits, and for the attractive flowers. Flower diameter 3.5cm. Photograph M. L. Lessiter, DSIR.

# *Cordyline* 'Ti Tawhiti' and its relationship to *Cordyline* 'Thomas Kirk'

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## Ti tawhiti and 'Kirkii'

In recent times interest has been expressed in the origin of the ornamental *Cordyline* 'Kirkii' (Beever 1989, Edwards 1990). This plant is not commonly grown being regarded more as a garden curiosity of particular interest to people who use New Zealand native plants as ornamentals. Recently, Heenan (1991) replaced the name 'Kirkii', with the cultivar name 'Thomas Kirk', as the Latin name 'Kirkii' was invalid under the International Code of Nomenclature for Cultivated Plants 1980. The name 'Kirkii' was first published in Duncan and Davies Nursery Catalogue (1976) where it was described as a low growing clump forming cabbage tree with attractive rich green foliage to the base of plant and 1m tall.

The source of the name 'Kirkii' is uncertain and the origin of the plant to which this name was applied appears not to be recorded. Heenan (1991) indicated it has been in cultivation since at the least the 1920's having been listed in Duncan and Davies Nursery Catalogue in 1926 but misidentified as *Cordyline terminalis*. He classified 'Thomas Kirk' under the species *Cordyline australis* (Forst. f.) Endl., to which the cultivar has general vegetative similarities. There is a common opinion in ornamental horticulture that the cultivar is a dwarf form of *C. australis* (Beever 1989, Edwards 1990, Heenan 1991).

The botanical description of 'Thomas Kirk', based on an eight year old plant grown in a garden at Maori Hill, Dunedin, states that it is a plant growing up to 50 cm tall forming densely branched clumps of short branching stems arising from both above and below ground. Heenan (1991) notes that the flower was not seen, and it is a widely commented on characteristic of 'Thomas Kirk' that it is not known to flower.

In an early paper on the cultivation of native trees and shrubs Potts and Gray (1870) described a *Cordyline* species, the Titawhiti (sic) of the Wanganui tribes, as having a dark green leaf and throwing off young plants more freely than other *Cordyline* species. Earlier Hooker (1867), in corrections to his Handbook of the New Zealand Flora, referred to an uncertain *Cordyline* species, the Ti-Tawhiti (sic), grown by Wanganui Maori, which he described as having a long dark-green leaf and a thick flexible pulpy stem, which they propagated by layers. Hooker indicated that he had only seen young plants of ti tawhiti, presumably non-flowering plants, and so was uncertain of the taxonomic status of this plant.

In the chapter on *Cordyline* in his book on Maori agriculture, Best (1925) describes the use of species of this genus by Maori, including the New Zealand indigenous species, the introduced species *Cordyline*

*fruticosa* (L.) Chev. (syn. *C. terminalis* (L.) Kunth) known to Maori as ti pore, and several cultivated varieties. The cultivated varieties included ti tawhiti, which was also named ti para and ti kowhiti by Maori tribes in the Taranaki, Wanganui and East Coast regions of the North Island. Best's account of the plant he grew in his own garden in Napier, and accounts by other people he includes in his chapter on *Cordyline*, indicates that characteristically ti tawhiti was a plant shorter than 1.5m, that it produced adventitious shoots often from below ground, and that it was not known to flower.

The description provided by the botanist and missionary William Colenso (1811-99), which is included in Best's (1925) account, is the most detailed available of the plant known to Maori as ti tawhiti. He described it as growing to four to five feet in height, never quite erect, and then sending suckers from below ground and from the stem after which the original stem died. The leaf was shorter and broader and of a finer texture than of *C. australis* with slightly recurved edges, and its bark was thinner, smoother and not as rugged as that species. Colenso recorded that Maori knowledge of the plant, and his observation of growing it in his garden, was that it did not flower.

Colenso (1880) believed the plant was a distinct species and gave it the provisional name *Cordyline edulis*. He recorded that he sent a specimen of this plant to Hooker. However a search for this specimen in the Herbarium of the Royal Botanic Garden, Kew, which contains many specimens Colenso sent to Hooker, has not found it.

The possibility that the names ti tawhiti and 'Thomas Kirk' apply to the same plant arose in March 1991. This was in the course of exchange of information between the authors in pursuit of their interests in the economic uses of *Cordyline* as ornamentals, or as a source of fructose and other raw material such as fibre. Besides the non-flowering characteristic of 'Thomas Kirk', the key characteristics of short stature, leaf shape, smoother stem surface, and adventitious shoot formation, which link this cultivar with ti tawhiti, are illustrated in Figure 1.

Heenan (1991) suggests the plant was named after Thomas Kirk (1828-98) regarded as New Zealand's leading botanist in the late nineteenth century. This contribution examines historical links between ti tawhiti and the ornamental cultivar 'Thomas Kirk'. It associates these links with the work of Thomas Kirk and other botanical personalities and members of the ornamental plant industry. As a conclusion of these considerations the plant is reclassified. The ethnological significance of ti tawhiti will be discussed elsewhere. Investigations of the taxonomic status of the

plant are continuing. It is hoped that this contribution will bring forward further information which will help to confirm the origin of this interesting plant.

## Association with Thomas Kirk

Although it is not known who gave the name 'Kirkii' to the ornamental plant, or where the original stock plant used by Duncan and Davies came from, there is good evidence that Thomas Kirk had a strong interest in unusual forms of *Cordyline* and in ti tawhiti in particular. In an article (Kirk 1873) giving notice of an undescribed species of *Cordyline*, to which he gave the provisional name *C. hookerii*, Kirk also mentioned a plant cultivated by Upper Wanganui Maori. He noted that the foliage of this plant suggested it was closely related to *C. australis* and commented that flowers of the plant were unknown. The journal editor gave the name of the plant as Ti-tawhiti in a footnote.

Kirk (1895) also gave notice of an undescribed palm-lily on the Auckland Peninsula based on material obtained near Ahipara. He gave this the provisional name *Cordyline cheesemani*. This name is not given in synonyms for native plants listed in Moore and Edgar (1970). From the description of the leaf given by Kirk it seems that it was based on a plant of *Cordyline fruticosa*. The presence of this species in New Zealand was confirmed by Walsh (1900).

Of considerable interest is the record of a discussion on a paper by Rutland (1896) that took place at the second meeting of the New Zealand Institute in 1896. This paper touched on plants introduced into Aotearoa-New Zealand by Maori, specifically paper mulberry (*Broussonetia papyrifera*), taro (*Colocasia esculenta*), hue (*Lagenaria siceraria*) and kumara (*Ipomoea batatas*). A large part of the discussion related to a "species of *Cordyline*, which had never been known to have flowered in New Zealand, and which might turn out to be a plant that flowers in a warmer climate". This comment by Thomas Kirk was prompted by the hope expressed by the ornithologist, Sir Walter Buller (1838-1906), that Kirk would include in his forthcoming Students' Flora of New Zealand descriptions of all plants found in the country by the first European discoverers, whether actually indigenous or introduced by the Maori. There ensued a discussion that highlighted a difference of opinion between botanists and zoologists as to what species can be regarded as indigenous. It was in pursuit of this discussion that Kirk made reference to the *Cordyline* species.

The explorer and geologist Sir James Hector (1834-1907) added that the plant referred to by Kirk was the curious Ti-tawhiti (sic), meaning the ti (cabbage tree) from a



Fig 1. Part of a plant of 'Ti Tawhiti' when excavated from the garden at Maori Hill, Dunedin. The horizontal line shows the level of the soil surface. Note the adventitious shoots arising from below ground, the short stems, the base of a stem that has died back, and the irregularly shaped rhizome giving rise to roots.

distance place, supposed to be a *Cordyline*. Hector said this ti never flowered in New Zealand, was grown by Taranaki Maori, and had large bunches of rather thick green leaves with long intervals of stem. He said that he had seen a similar plant in Sydney, said to have come from New Zealand, which the Director of the Royal Botanic Garden, Mr C. Moore, had informed him had produced a blue flower. Hector said he had brought suckers of this plant back to New Zealand, and that it should be in the Wellington Botanic Garden. Mr William Travers (1819-1903), a noted naturalist, said there was a very similar plant growing in a garden near Plimmer's Steps in Wellington, thought to be from Queensland. Buller added the comment that ti tawhiti was a very scarce narrow-leaved *Cordyline*

and he believed he had seen the flower, which was pale blue.

It was also mentioned at the meeting by Mr Harding that Colenso had a rare plant of this kind in his garden at Napier named *Cordyline edulis*, the sole representative of the species. The name *C. edulis* is not in Index Kewensis but has been found in the undated nursery catalogue of Thos. Horton, Ltd., Nurserymen, Hastings and Pahiataua. This catalogue gives the description "Leaves light green, growth similar to *C. indivisa* but the leaves are much narrower." The date for this catalogue must be between 1905 and 1923 when Thomas Horton owned a nursery in Hastings, although he had practised as a nurseryman from late in the 19th century. The name *Cordyline edulis* (sic.) is also given in

a select list of native plants in a 1906/7 catalogue of William Martin and Son, Nurserymen and Seedsmen, Dunedin.

What is apparent from the above information is that prominent natural scientists in the later part of the 19th Century regarded ti tawhiti as being sufficiently distinct to be considered as a species. It seems they were not confusing it with *C. fruticosa*. *Cordyline fruticosa* has distinctly different leaf characteristics and was found as relic plants only in warmer coastal parts of the north of the North Island. Also it is apparent that Kirk had a very specific interest in ti tawhiti because of the problem it posed in respect to what plants should be included in the Students' Flora of New Zealand he was writing. Therefore it is possible that Thomas Kirk's interest in ti tawhiti led to the attachment of his name to the plant, even though it had been first introduced as an ornamental with the name Titawhiti (Potts and Gray 1870).

However it should not be overlooked that the name could result from a connection with two of Thomas Kirk's sons, both notable in their own right. They had connections with botany, horticulture and Maori affairs, which could have made them aware of ti tawhiti. Harry Borrer Kirk, was Professor of Biology at Victoria University College and also assistant inspector of native schools earlier in his career. Thomas William Kirk was chief biologist with the Agricultural Department (Scholefield 1925). Both Thomas Kirk and his son Thomas William Kirk had important connections with the horticultural industry in New Zealand (Hale 1955).

#### Association with Thomas Horton

If it could be established when, where and who applied the name 'Kirkii' then the link between ti tawhiti and the plant used as an ornamental would be conclusive. It seems likely from the historical evidence that the plant was adapted as an ornamental from more than one source and by different people.

One connection promising for further investigation is that with the horticulturist Thomas Horton. Details of his career (Hale 1955) show that he was a foreman in the nursery of John Goddard in Havelock North late in the 19th century, a position that would have certainly brought him into contact with William Colenso in Napier. From the early part of the 20th century Horton built up a large nursery business with locations in Pahiataua and Hastings. It was during this time that the entry for *Cordyline edulis* appeared in Horton's Descriptive Catalogue. Horton's enterprise, which included the supplying of fruit trees to large areas of orchard in New Zealand and the exporting of trees to Australia and South America, was for a time very successful. However he was forced out of business in 1923 by the depression in the orchard industry in the period after World War I. He went from this situation to become curator of Pukekura Park in New Plymouth, a position he held for 25 years.

Consequently Horton would have been in New Plymouth at the time when Duncan and Davies Nursery was rapidly expanding in that town (Hale 1955). Thus he may well

have been influential in that nursery taking up the plant that they first called *Cordyline terminalis* and later 'Kirkii'. The account of Horton's career (Hale 1955) includes mention of him having working contact with both T. and T. W. Kirk, and reference to the papers and letters of these people could provide the missing link. A record that Thomas Kirk also had contact with the Dunedin nurseryman Mr Martin who advertised *C. edulis*, is provided by acknowledgement of material of *Veronica erecta* sent to Kirk by Martin (Kirk 1896).

The confusion with *C. terminalis* in Duncan and Davies first listing of the plant suggests a reason why the link between ti tawhiti and the ornamental was overlooked. In the decade from 1899 all the leading personalities involved in the 1896 New Zealand Institute discussion had died: Kirk (1899), Colenso (1899), Travers (1903), Buller (1906) and Hector (1907). With this loss of scientifically based opinion about the plant, and with Walsh's (1900) confirmation that *C. terminalis* had been introduced by Maori, it is possible that the distinction between ti tawhiti and ti pore was overlooked and an opinion formed that they were different names for the same plant introduced by Maori. Although later Best (1925) made a clear distinction between ti tawhiti and ti pore, his account gives the impression that ti tawhiti was a plant of the past.

#### Taxonomic Status

Until this plant can be induced to flower its taxonomic status can not be established with any certainty. It is also impossible at this stage to be certain that the plant belongs to the species *C. australis*. Indeed it remains possible that it could be a species of the related genera *Dracaena*, *Pleomele*, or *Sansevieria* which can only be separated with total certainty by reference to floral characters (Brown 1914). Tomlinson and Fisher (1971) commented that there was uncertainty about the number of species contained in *Cordyline*, and estimates range from about 12 to 20 (Beever 1983). As well as the five New Zealand species, Tomlinson and Fisher (1971) included in their count two species from eastern Australia and single species from each of South America, Mauritius, the Mascarenes, New Caledonia and Norfolk Island as well as *C. terminalis* which has a wide human assisted distribution in the Pacific. More recently Pedley (1986) described seven species of *Cordyline* indigenous to northern New South Wales and Queensland.

The suggestion, mentioned in Beever (1989), that cultivar 'Kirkii' could be *Sansevieria kirkii*, a species from tropical East Africa, is not supported by an illustration and description of this species in Graf (1982). This shows *S. kirkii* to have erect, succulent, greyish-green mottled leaves, very different from the leaves of *Cordyline* 'Thomas Kirk'.

Different possibilities are that the plant is an unnamed species which has become extinct in the wild, a hybrid of the New Zealand species, a mutant form of *C. australis*, or a distinct variety in the range of variation of *C. australis*. Our present conclusion is that it is most likely a distinct species.

Although New Zealand species of *Cordyline* hybridise readily (Moore and Edgar 1970, Moore 1975, Beever 1981), the plant does not conform to what could be anticipated from the possible hybrid combinations. Of possible *C. australis* hybrids, the one most likely to give a plant of low stature would be that with *C. pumilio*, but this hybrid could be expected to have much longer and narrower leaves. As 'Thomas Kirk' differs from *C. australis* by several characters it seems unlikely that it is a dwarf mutant of *C. australis*. Also its morphological characters place it outside the range of variation of natural populations of *C. australis*.

#### Native or Introduced?

There remains the question as to whether ti tawhiti is a plant indigenous to New Zealand or whether it is a plant introduced by Maori prior to European contact, or during the early period of European exploration and settlement. This latter suggestion seems unlikely, but is given some support by the observations on the flowering of a similar plant in Australia mentioned in the 1896 discussion at the New Zealand Institute meeting. However, it is more likely that in early European exchanges between Australia and New Zealand the importance of the ti tawhiti to the Maori would have been noted and cuttings of the plant would have been taken to Australia for observation.

It is also possible that there is an Australian species with blue flowers which has vegetative similarities to ti tawhiti. This species could be *Cordyline stricta*, which occurs in the Sydney region (Beadle et al. 1982) and has white to purplish flowers.

As mentioned previously, another possibility is that the plant is a relic of a New Zealand species now extinct in the wild, which was selected by Maori and maintained in cultivation as a food plant. This could have included selection for non-flowering to produce stronger vegetative growth, a widespread feature of root and tuber crops.

The possibility of domestication of a New Zealand plant is contradicted by Maori tradition about ti tawhiti which says that it was brought to New Zealand from Polynesia in the canoe Aotea (Best 1925). Also the non-flowering of the plant may be because it is a plant of tropical origin. This possibility was mentioned by Colenso (1880) who made the comparison with kumara and taro which usually do not flower when grown in New Zealand. A scan of the Floras of the Pacific Islands from which the Maori are presumed to have migrated, has not found a plant fitting the description of ti tawhiti. This does not exclude the possibility that ti tawhiti is a Pacific island plant, for it may have been of marginal value as a food plant on those islands and subsequently discarded and lost as new food plants become available. However, in New Zealand, where Maori had only a small number of cultivated food plants, ti tawhiti would have retained its value and been conserved under cultivation until the introduction of new food plants by European explorers and settlers.

#### Definition of Cultivar 'Ti Tawhiti'

The information that has been assembled indicates that the Maori crop plant ti tawhiti

and the ornamental cultivar 'Thomas Kirk' are the same plant. Therefore its correct cultivar name is *Cordyline* 'Ti Tawhiti', defined as follows:

*Cordyline* 'Ti Tawhiti'

(J. D. Hooker, Handbook of the New Zealand Flora Pt. II, p. 743 [1867] as *Cordyline* sp.? Ti-tawhiti.) Ti-tawhiti is an orthographic variant and it is considered appropriate to keep the Polynesian generic name for *Cordyline*, ti, separate from the specific name, tawhiti, which has the meaning 'from a distant place.'

Syn. *Cordyline edulis* W. Colenso, *Transactions of the New Zealand Institute* 13, 3-38, [1880], nom. illeg. Not validly published because stated by the author to be provisional (International Code of Botanical Nomenclature 1988, Art. 34.1.b). The name *C. edulis* was listed by horticulturists in early New Zealand nursery catalogues.

Syn. *Cordyline* 'Kirkii' (Duncan and Davies Nursery Catalogue, 81 [1976]).

Syn. *Cordyline australis* 'Thomas Kirk' (Peter Heenan, *Horticulture in New Zealand* 2, [1], 6-7 [1991]).

**Representative specimen:** CHR 468512. P. B. Heenan, 61/91, Cultivated DSIR Lincoln Experimental Gardens.

A search of *Cordyline* specimens in the main New Zealand herbaria has found only one specimen bearing the name ti tawhiti. This is a specimen from the Herbarium of T. F. Cheeseman located in the Auckland War Memorial Herbarium (specimen number 3152). It consists of a single leaf which has characteristics typical of *Cordyline* 'Thomas Kirk'. The sheet bears the inscription:

*Cordyline*  
from a plant at Horohoro  
said to have come from  
Kapiti Island — native name  
Titawhiti

H. J. Matthews

The inscription is in T. F. Cheeseman's hand writing and is undated. Henry John Matthews (1859-1909) was Chief Forester, New Zealand Forestry Department. He collected plants in many parts of New Zealand, and maintained a large collection of plants in his garden in Dunedin.

Besides the chronological precedence of the name 'Ti Tawhiti', application of this name will bring to attention the cultural and historical significance of this plant to the heritage of New Zealand. Although considerable evidence has been presented that ti tawhiti, an ancient crop plant of Maori, has been conserved to modern times because of its use as an ornamental, much mystery still remains attached to it. However, now that the history of ti tawhiti has been rediscovered, modern scientific techniques can be used to investigate both its taxonomic status and whether it is a plant introduced into New Zealand. More evidence can also be sought to determine how the connection between ti tawhiti and cultivar 'Kirkii' was overlooked for more than 50 years.

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# New Zealand Has its Own Green Tea Industry

P. E. Smale

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Interest in establishing a tea industry in New Zealand goes back over 70 years to the Motueka area when tea (*Camellia sinensis*), along with other crops, was considered as a crop for the region. As it turned out tobacco became the favoured plant to grow probably because of the faster cash flow. However, although no industry established at that time, plant material was imported and established on the coastal area of Marahau and some plants remained in that area at least until the 1950's.

A further attempt at establishing tea was made in the 1960's when the West Coast South Island Public Relations Officer, an ex tea planter, introduced the crop to that region. Records suggest that seeds were imported and germinated but, for a number of reasons, farmers did not take up the challenge of introducing a horticulture crop at that time. Some of the original plants still exist and display the typical variation expected from seedling material.

The latest attempt to establish an industry began in 1979 following a visit by a Motueka tobacco farmer to the Nerada Plantations in Queensland. His return coincided with the first announcements by the Government of the day of removal of protection from and restructuring of the local tobacco industry. After initial discussions with DSIR Riwaka Research Station staff, seed from several sources was imported and plots set up to evaluate whether the crop would in fact grow here. Some severe frosting occurred on plants from seed from Tanzania while plants from seed of other sources were successful.

The leaf shape and colour variability was extreme and it was obvious from these very preliminary investigations that production from selected clones was going to be essential. Although how superior types were to be selected had not been considered it was clear a cheap and rapid method of propagating very large numbers of plants was necessary and investigations into various methods of producing plants from cuttings were initiated. This was to assist later developments and helped the green tea project once it began.

A feasibility study soon showed that without Government support, black tea production was going to be a long time in becoming economic. New Zealand is too far from world tea markets, Government support on more favourable terms than for other crops was not available and New Zealand's production costs would be higher than for most other tea producing countries. At this point the black tea project foundered and essentially ceased. However, a Japanese company noted with interest the work already done in Motueka and approached the fledgling New Zealand group. The Japanese party were interested in southern

hemisphere production of high quality tea to supplement and blend with Japanese-produced green tea from the opposite season. With definite market prospects the first interest in a New Zealand green tea (*Camellia sinensis*) industry was aroused.

A core of interested growers levied themselves to form a fund for further investigatory work. Two members of this group then travelled to Japan in 1981 and purchased the first cutting material of the cultivar 'Yabukita'. This was propagated by the Ministry of Agriculture and Fisheries Quarantine Service at Levin and released to Riwaka in May 1983. These 800 plants formed the stock beds from which much of

the first million plants were taken. Two further importations of cuttings were made but neither were successful and so it was decided to persevere with the original 800 plants. Later cuttings became available from plants successfully established in the field.

## Propagation Trials

The Japanese firm suggested a need for 100 hectares or approximately two million plants to produce their required quantity. The Riwaka Research Station had earlier investigated several methods to produce plants cheaply, one of which was an enclosed plastic tunnel system that was ex-

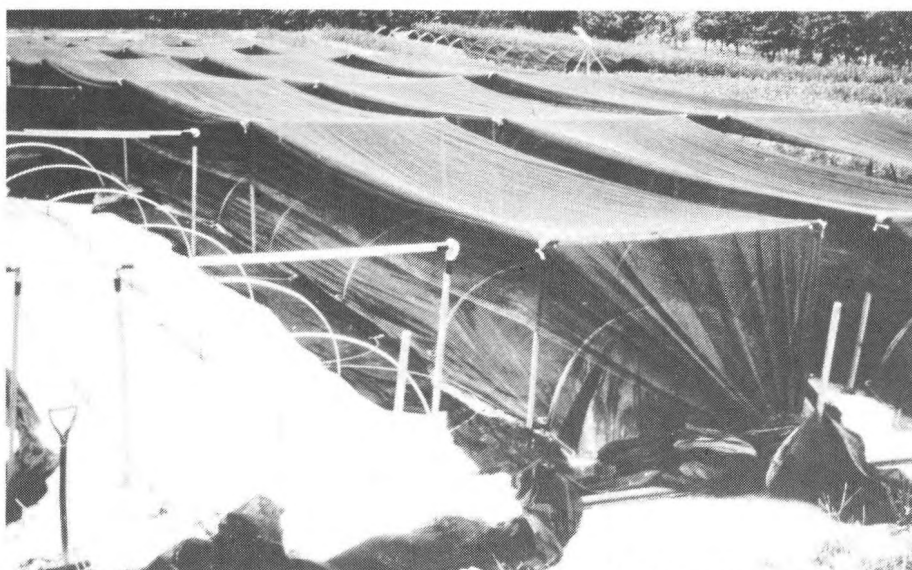
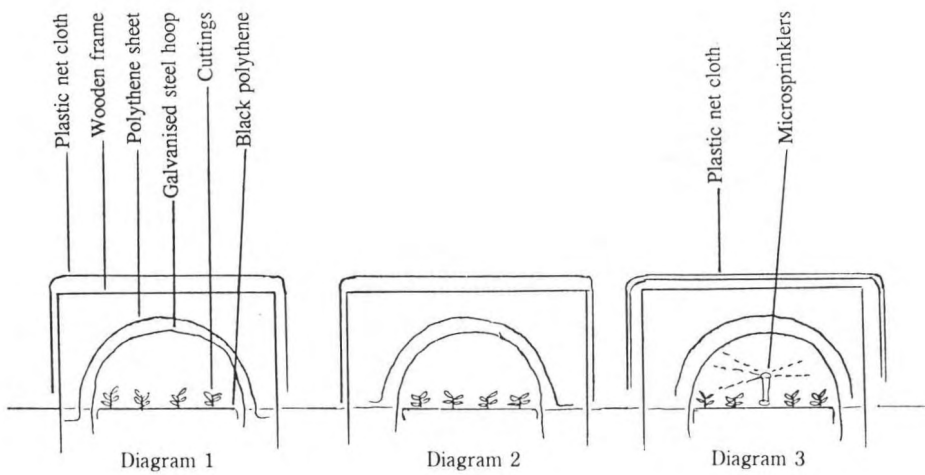


Fig 1. Details of propagation tunnels showing plastic soil cover, hoops for the tunnel cover and the netting shade cloth.



Fig 2. Cutting beds in 1989 with covers partially removed.





tremely successful for propagating hop cuttings. This consisted of frames made up of 100 x 25mm timber filled with a 50:50 peat:coarse sand mixture and covered by clear polythene suspended on wire hoops to completely seal the cutting beds, the whole being within a shadehouse. The system gave excellent results but when considered at a size able to produce two million cuttings it was obvious that the cost would be very high. Semi hardwood cuttings set in the February-March period consistently gave 90-95% rooting within two months. These were large enough to field plant later in the spring of that year using hand planting techniques, a method which was also going to be unacceptable as numbers and area increased.

Employing a similar system, setting cuttings directly into the soil and covering with polythene tunnels, gave sufficiently good results to persevere with and the ultimate system used for the majority of the cuttings developed from this method. It was clear that three modifications were necessary: some means of shading the tunnels to combat the very high temperatures, a means of moisture regulation, and weed control. Soil fumigation with Dazomet failed to kill clover seed which grew to smother the cuttings.

At the same time that this outside system was being developed, Dr D. Cohen of DSIR Plant Physiology Division and Mr B. McKay of the Nursery Research Centre, were investigating tissue culture and mist propagation techniques. These were both ultimately discontinued because of cost and the continuing success of the outdoor method, though mist propagation with bottom heat at both Riwaka Research Station and at the Nursery Research Centre was successful in increasing the number of stock plants available and allowed the use of much less mature cutting wood.

### Larger Scale Propagation

With the plants from quarantine now established well in the soil at Riwaka, late 1983 saw the first bulk propagation material available and the modification of the boxed tunnel house system to outside conditions. The land area chosen for this was a light phase Riwaka silt loam, very open and friable but stony, which created major problems as cuttings were inserted. Galvanised steel hoops were chosen to form the basis of

the polythene support system and they were set in long rows, over rotary hoed and raked beds and covered with polythene dug into the soil along one side.

Cuttings were prepared by taking 8-10cm lengths of leafy mature wood, removing a sliver of bark from the base, dipping into Seradix No. 2 rooting hormone and setting at approximately 2.5cm squares. As portions of the bed were completely set, the cuttings were hosed down and the polythene cover dug in and sealed along the second side (Diagram 1). It was soon noted that temperatures up to 40°C were occurring and cuttings were desiccating. To counter this a further modification was made by placing a light timber frame over the top of the tunnels and attaching plastic net wind break cloth to this. It was found that two thicknesses of cloth gave sufficient protection. Eventually the beds, each containing 20-25,000 cuttings were filled and sealed. Callusing began in approximately one month after sticking. Cuttings were taken from mid December until growth ceased and available wood ran out, around March 1984.

Moisture within the tunnels condensed on the covers and very little drying out occurred. Two main problems were apparent — excessive weed seed germination, particularly of clover, chickweed and *Poa annua*, and *Glomerella cingulata* infection.

Periodic lifting of covers to spray with captafol or prochloraz and to hand pull the weeds was necessary. This added considerably to the labour costs of the whole operation.

Late spring of 1984 saw two further changes; the polythene covers were just placed over the metal frames to ground level but not buried along the edges, and cuttings were inserted through a black polythene mulch beneath the hoops to eliminate weeds. Both these proved to be helpful and became standard practice from 1986-87 onward (Diagram 2).

Soils around the Riwaka Research Station vary considerably and it was decided to move on to a stone-free very silty site for the major cutting effort from 1987 onward. This proved to be invaluable when it came to lifting plants. The polythene cover was narrowed leaving air space between the edge and the ground level as in Diagram 3 and a micro sprinkler system was added so that the very large area now under production could be irrigated more efficiently.

It became evident that if 8-10cm cuttings were continued with there would be a delay of a number of years until the required number of plants was raised and a change was made to single leaf bud cuttings. This led to considerable economy in wood used. Cuttings were thus reduced to 2.5-5.0cm length depending on the nodal length, a sliver again taken off one side, dipped into Seradix No. 2 and then set (Diagram 4.). Shorter cuttings rooted as well as the longer ones.

Not sealing the tunnels had a marked effect on reducing the infection by *Glomerella* and other fungal pathogens.

This system worked well and has produced in excess of two million green tea cuttings. Mistakes were made, there were inexplicable cutting deaths, *Glomerella* was a major problem in some seasons and nutritional problems with cuttings were never satisfactorily overcome. Despite these problems the system is cheap, is effective for this crop and could well be modified further for other large scale propagations.

Between 1987 and 1989, cutting removal from stock plants ceased between end of March and early May depending on the



Fig 3. Field planting of tea.

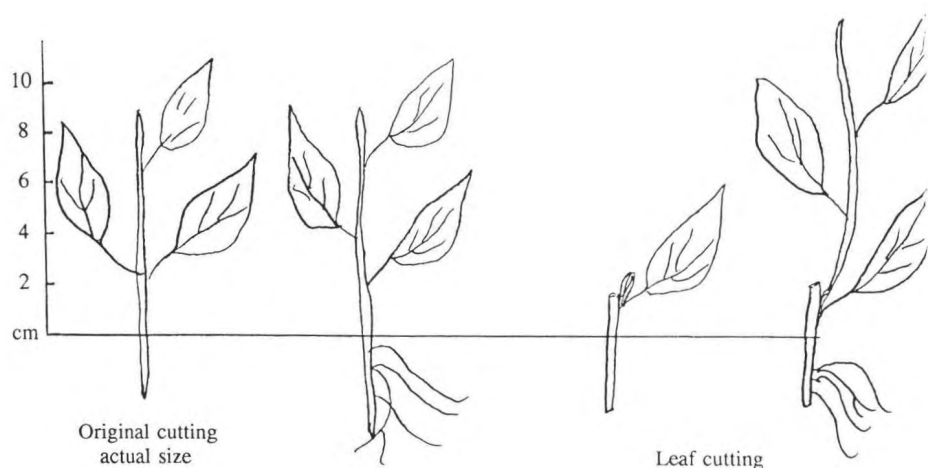


Diagram 4

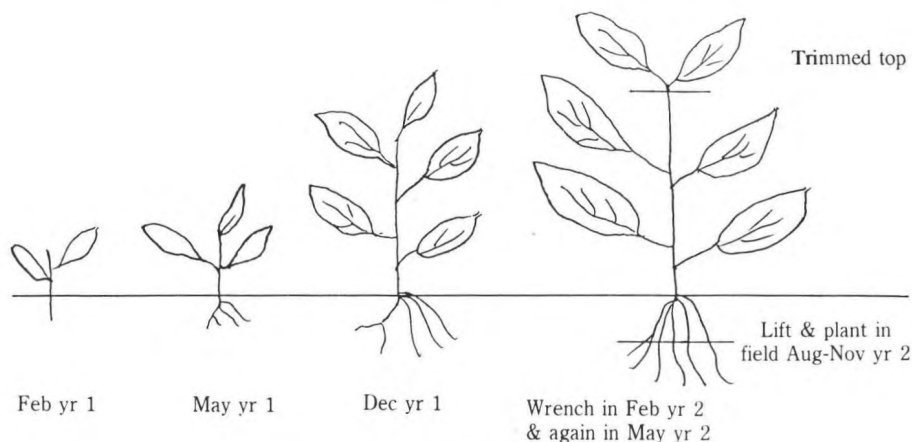


Diagram 5: Stages in cutting growth

weather conditions and available wood. Cuttings remained for the winter under the polythene and wind cloth covers during which time some liquid feed and fungicides were applied. In late spring, the polythene cover was removed leaving the shade cloth for a further month before that too was stripped off. At this stage every season the contact with bright light induced a severe and intense yellow colouring in the leaves which required numerous liquid fertiliser applications to overcome. To obtain cutting-grown plants large enough for winter/spring planting the season after cutting set, growth was maintained throughout the summer (Diagram 5).

Throughout the summer a proprietary liquid feed containing 7% nitrogen, 2% phosphorus, 4% potassium, 2% magnesium and trace elements was used weekly and where necessary fungicides and an occasional insecticide, mainly for black aphids, were included.

#### Field Establishment, Maintenance and Harvesting

Wrenching was carried out in February and May of each season using a hydraulically mounted steel bar behind a tractor to cut beneath the rooted plants. This had a lifting effect and made the plants much easier to pull for planting. Cuttings were also topped once or twice during the summer to a standard height of 20cm making them ideal for planting. Lifting began in August and continued throughout spring.

Plants were dug in clumps using a hand fork, separated into singles and stacked into boxes to be taken to the farms for planting. First field planting was carried out in 1987 when a modified orchard tree planter proved successful for the bigger plants initially used as stock but once bed grown cuttings became available a Powell tobacco planter was found to be adequate. On most



Fig 4. An established planting of tea.

sites a field take of 95-99% has been achieved.

Plantings have been restricted to that area north of Upper Moutere and the Motueka valley and plains, Nelson province, with on-farm areas ranging from 0.5ha to 25ha. All soil types have been planted from clays to stony silt loams and most have been successful. With establishment of any new crop there are always going to be unsuitable areas and other limiting factors and this has proved to be the case with green tea. However just in excess of the required area will be established by spring 1991 and that will ensure the 100 harvestable hectares needed.

Weed control is a major factor in introducing new crops on this scale. Trials before commercial planting began showed tolerance to overall applications of oryzalin (Surflan at 4-6kg ai/ha) and this gave excellent initial weed control if used 3-4 weeks after planting and followed by irrigation or rain. As plants developed, simazine was introduced between rows together with paraquat, diquat and preglone. Established blocks have shown tolerance to a number of longer term herbicides while glufosinate ammonium (Buster) has been used for clover control.

During 1989, the farmers' group built an over-the-row machine to begin forming the bushes into a cutting table, and to apply herbicides, pesticides and fertilisers in one pass if necessary. This has been used by one operator on all of the gardens and has done much in preparing plantings for first commercial harvesting to begin in spring 1991.

Tea plants are very high nitrogen users so frequent applications of nitrogenous fertilisers are required. This has been applied either in liquid form through the irrigation system where possible or as solids. The pH requirement for successful *Camellia sinensis* growth is critical at around 5.0-5.5. Using very high rates of ammonium sulphate, soil acidification is rapid on local soils and eventually liming will be required to adjust pH and to ensure availability of other elements. Phosphorus and potassium are also

needed and these are being applied as solid fertilisers in most cases. Some farmers are now adding liquid fertilisers to their spray programmes which are mainly to combat aphids. No doubt as plantations mature other insect pests like scale will become a problem.

Shaping of bushes to form a flat top or cutting table enables mechanised trimming off and collection of the young shoots used for tea manufacture. Two leaves and a bud are the ideal growths for cutting so harvests can be as frequent as 20-30 day intervals. Over a season this will amount to 1500-2500kg dried leaf/ha (10% moisture content). In this region all harvesting will be by machine the first of which arrived in Motueka from Japan in April 1991. This is a straddle model which will cut the leaf and suck it into containers ready for removal to the factory for processing. New Zealand could not compete in any markets with an industry based on hand harvesting. The factory required is currently under construction. Green leaf arriving at the factory will be unloaded where it will first be lightly withered before passing into machinery which will steam, roll and dry the leaf. The major difference in processing between black and green tea is the elimination of an enzyme activated fermentation phase part way through the process which changes the colour and other characteristics of the tea.

Dried tea produced in Motueka will be known as "rough" tea and will be freighted



Fig 5. Mowing tea with a hand held harvester in early development trials.

to Japan for final processing and blending. It is expected that all "Motueka produced" tea will be exported and that it will not become available on New Zealand markets.

While DSIR Riwaka Research Station was intimately involved in the developmental stages of this project and acted as consultant to the grower group, since 1987 all of the propagation and establishment of production areas has been carried out by growers. Additionally the Japanese partners have given valuable advice during visits to the area.

The project provides a good example of successful co-operation between the private and public sectors, with the threads of hard work over a 10 year period coming together to make the establishment of a green tea industry in Motueka a reality in 1991.

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# The Banks Memorial Lecture 1991

## Garden Plants as Alien Invaders in Urban Auckland

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This 1991 Banks Lecture is about wild plants that are not native to Auckland. When Joseph Banks was in New Zealand in about 1770, nearly all the plants were native. His records have helped us to decide if some that arrived later were native or introduced. My particular concern is with plants that arrived much later. They were

brought here for a purpose, grew exceedingly well, then took up an independent existence when they escaped from cultivation. They are referred to here as garden escapes, though a few of these opportunists are shelter species, and one, a rather enthusiastic pasture grass. Since 1870 these plants have become a feature of Auckland, a

city unmatched anywhere in the world for its 600 or so naturalised species. The essence of this story is told in a short poem that Oliver Goldsmith and I wrote for the occasion.

It is called, "In Yonder Copse", and it goes like this:

Sweet Auckland! Fairest city of the land.  
Before the white man took a hand  
In bracken hills and wooded dell,  
The needs of man were furnished well.  
In yonder copse the native flora grew,  
And weeds of gardens were but few.

The sailing ship unloading on the strand  
Implanted new life in vacant land.  
And so the cultivation was begun,  
The first bold steps of introduction done,  
For food, ornament and screen,  
The kind this land had never seen.

Around the cottage by the lea  
Sweet flowers of every kind ran free.  
But soon their future raised alarm.  
Alas! They had begun to arm  
With shoots, and bulbs, and seeds, and spores  
To fill the gaps that life abhors.  
No blight, or bugs of any kind,  
As these had all been left behind.  
No chills to nip, or droughty clime,  
And soil so rich, Nature's potting shed sublime.

In yonder copse where privets grow,  
The wandering Jew is creeping low,  
The ginger flowering round the edge,  
And strangling vines in every hedge.  
On every piece of idle soil,  
They hinder, smother, taint and spoil.  
The bushland's scathed, and pastures weak.  
Is this the kind of land we seek?

Sweet Auckland! weedy city second to none,  
We have lost control. What must be done?  
I saw in a dream the answer to our plight;  
The boardroom bosses had seen the light!  
They learned the words to fix this state  
"Educate, evaluate, facilitate".  
Ill fares the land to hastening ills a prey  
If weed proliferate, and men delay.

Now let us look at some of these points in more detail.

### Influx

There were wild alien plants here before 1840 but cape gooseberry is the only one that we can be sure of. In the following ten years the human population jumped from 1800 to 8000, and the area of cultivated land reached 8000 acres. Plant introductions increased mainly for food, shelter, and ornament. By 1870 many were already naturalised, among them brush wattle, castor oil plant, blackberry, brier rose, gorse, periwinkle and boxthorn. These species were probably imported directly but since then some of the aliens migrated from other parts of New Zealand.

The rate of naturalisation of plants of all kinds has been steady for more than a century at four a year, on the average — or one

every 80 days or so. Garden plants appeared in the wild at a rate of one a year until 1940, then suddenly took off at about three a year, probably in proportion to the rate of importation of new garden species. Since 1970 we have noted in the wild such species as *Acmena*, *Casuarina*, loquat, *Fatsia*, silky oak, Japanese walnut, *Malvaviscus* and *Rhaphiolepis*. All these were here for a long time before becoming established in the wild state.

What kinds of plants have naturalised? There are trees, shrubs, vines, annuals, perennial herbaceous plants and ferns. Of the 105 tree and shrub species, only inkweed was not brought here for a purpose. Three-quarters of the vines are from gardens. These aliens have come from many countries, but mainly from Europe. All 27 from temperate Asia are (or were) cultivated, 46 out of 82 from Central and

South America, 48 out of 57 from Southern Africa, and 28 out of 50 from Australia.

### Establishment

The process of self-establishment and self-perpetuation of alien plants is naturalisation. The successful plants are ready-made invaders in an environment often more favourable than the one they came from and they left most of their pests and diseases behind them. The welcoming environment offered no extremes of temperature, nor periods of inadequate rainfall. It is not surprising that Auckland has accepted species from sub-tropical to cool temperate zones. Species growing wild in Auckland can be found in their natural state on almost every degree of latitude from 43°S to 71°N.

The environment is further enhanced by the presence of "holes" (niches) in the existing flora. The extensive Auckland



Fig. 1. A live hedge infested with kikuyu grass is doomed.



Fig. 2. Moth plant eventually turns up in every Auckland garden.

waste land with many "holes" is often the first refuge for garden escapes on the run.

### Impact

Why all the concern when so many aliens add value, variety and colour to the landscape? Many, but not all, impinge adversely on our welfare, and thus are weeds. They suppress more desirable plants, obstruct man, animals and machinery, impair health, contaminate produce, lower the value of natural features, and promote fire. When points are allocated for each of these weed features, and have added to them a rating for the potential of the species, we have an index of weediness that separates out the super weeds. Those scoring most points in urban Auckland are moth plant, smilax, climbing asparagus, two species of pampas grass, *Elaeagnus*, kahili ginger, tree privet, Japanese honeysuckle, kikuyu grass, climbing dock, woolly nightshade and wandering Jew. All these were introduced for a purpose. Extend the analysis, and we have another 17 threatening plants. These, too,

are all escapes from cultivation. This DSIR study is detailed in the New Zealand Journal of Botany in 1987 and 1988.

In a country protected by its isolation until 150 years ago from forces which altered the face of the settled world, this level of naturalisation is cause for concern. But the invasion has only just begun, and there are only minor controls against the importation of many more threatening species.

What is also disconcerting is the potential to genetically modify plants beyond anything that occurs in nature. It takes only accidental increased hardiness or enhanced reproduction to create a super weed.

### Solutions

Perhaps we should attempt to stop undesirable plants before they reach New Zealand, or before they get beyond the plant shops, beyond the garden, or into other districts. Unfortunately, there are leaky barriers at all these points. There is a strong demand for new garden subjects, and

tremendous potential to supply them. Propagating material can be smuggled past border protection services. Prohibition is not always practical because plant behaviour in new surroundings is fairly unpredictable. *Acmena* was here for 100 years before it showed signs of aggression. I attribute the change to the increase in numbers of the seed-carrying native pigeon given better protection in the suburbs from poachers. Still, common sense should awaken suspicion if a member of a genus misbehaves badly anywhere in the world. We have four free-seeding species of *Asparagus* now. What barrier prevents a fifth from arriving?

The sale of undesirable plants will continue as long as there is an unsuspecting public to buy them. There is a recent report of old man's beard being offered for sale, in spite of all the publicity. A modern seed catalogue advertises moth plant, pampas, privets, old man's beard and others.

The escape from gardens may go unnoticed because garden subjects are familiar plants. This gives lead time before action is taken. Tree privet probably escaped in the 1880s but was not recorded in the wild state until 1958.

Plants escape by normal dispersal of propagules, and by gardeners disposing of surplus stock. A Palmerston North gardener holidaying in Northland transplanted woolly nightshade into his garden and later dumped seedlings over a roadside bank in 1962. An alerted noxious weeds inspector took action (though he had no authority to do so) but vigilance was relaxed when he retired and a healthy infestation has developed.

Reducing and confining established infestations occupies most of the weed control effort. When a species becomes threatening, the first reaction may be to want to have it declared a noxious plant to give it legal status, and a requirement to do something about it. Administrators, rightly, must ensure that there is a significant menace, that there is a practical means of control, and that the regulations can be enforced. There is thus immediate facilitation inertia, particularly if the decisions are not made where the problem occurs. Providing supporting information is not the prime job of noxious plant officers, or of anybody else in particular. The submission must include figures because if you can't count it, it doesn't count. The most effective figures measure loss of production but this is not appropriate for most weeds of garden origin unless they invade farmland. As a consequence there is no legal requirement for anybody to do anything about most of the prime weeds of Auckland. This inertia, and absence of any positive philosophy, does not bode well for treating other species which seem capable of a wild existence.

While the Noxious Plants Act does not require officers to evaluate undeclared menacing plants, most make their own unofficial assessments. Two noxious plant officers employed by a local body near Auckland, Don Rhodes and Lance Vervoort, exceeded their duties by evaluating herbicides against wild ginger. Their results offered hope for hundreds of residents who were fighting a losing and hand-to-hand battle against it.

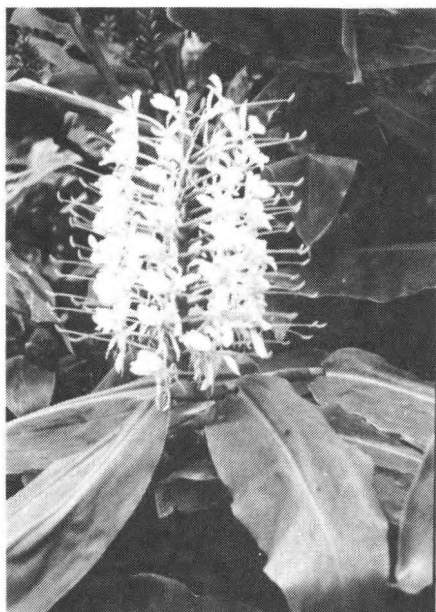


Fig. 3. Kahili ginger, a queen of flowers and a devil of a weed, can grow anywhere that a palm tree survives — so be warned!

This research facilitated a bold programme which eliminated some infestations that the administrators preferred not to know about.

Education will go some way to overcoming inertia. The Noxious Plants Act urges officers to inform the public, and this they do in talks to schools and by displays where people gather. This awakens an awareness in children, and they can quickly learn that care of their surroundings is the soap and toothbrush of landscape hygiene. Unfortunately, public interest verges on apathy until a person is plagued with a particular problem plant. Scarce information resources has something to do with this.

Changes in local government administration seem to have yet done little to promote a logical and committed strategy for coping with weeds, but policy makers, being local residents, are more likely to know the problem at first hand.

#### The Future

I take the year 2019 as my target date. Why? If the invitation to be the Banks lecturer comes to me in a 28 year cycle, I may be talking to you on the same subject then. In case the invitation is not extended, or I fail to reach 90, here are my predictions.

The Auckland scene will then be very different. Reduction of area of waste land, and suppression of naturalisation potential by kikuyu grass, by then expected to grow in

every grassy place, may do little to slow the flow of wild alien species, then likely to exceed 800, more than half of them garden escapes. Most of the pampas will be gone, and almost all of the *Elaeagnus* if a concerted campaign is mounted soon. Privets will still be abundant, vines will be much more prominent, and we will look back to 1991 when the forest remnants were in a more natural state, and the many native plants beneath the canopy were fairly easy to walk through. We will also recall the days of live hedges. By then the environmentalists will have realised that they did not recognise the greatest conservation issue of the day. Alien plants changed the face of the lowlands as nothing else could, and nobody thought to call it pollution.

My exhortation to educate, evaluate and facilitate may be forgotten, or was unheard, as land managers devise policies to prevent undesirable plant importations, the sale of weedy plants, and the escape from gardens. New herbicides, and other means of control will offer more prospects. What I hope for more than anything else is a leader who can clearly see the issues, know what to do, and be given the facilities to do it. I expect a very weedy 2019 A.D.

# *Olearia x matthewsii* 'Highland Mist' — a New Interspecific and Cultivar name

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## Introduction

During the early 1930's the Dunedin nursery firm of H. Bennett and Sons won the Loder Cup in two successive years for their mammoth displays of potted native plants. In 1931 over 700 plants were displayed at Dunedin, and in the following year some 800 plants were shown in Christchurch. Among those plants grown for the Christchurch display was a hybrid New Zealand shrub daisy named by H. Bennett and Sons as *Olearia matthewsii* (Speden et al., 1932). Despite being shown at the Loder Cup competition this olearia never became widely grown or established in the nursery trade. Today, it is still occasionally cultivated and offered for sale under various names such as *O. matthewsii*, *O. ilicifolia* X *moschata* or simply *Olearia hybrid*.

Extensive searching of early horticultural and botanical literature has failed to locate a valid publication for the name *O. Xmatthewsii*. In fact, apart from Speden et al. (1932) mentioning the name as nomen nudum, the only other references to the name are newspaper reports of the 1932 Loder Cup competition. Metcalf (1987) also failed to locate a valid name as he comments "this plant really should be distinguished with a cultivar name". Two of the more significant references to this hybrid are Cockayne (1924) and Cockayne and Allan (1934), both of whom use the botanical hybrid formula *O. ilicifolia* X *moschata*. These two species are the assumed parents of the *O. Xmatthewsii* that was shown at the 1932 Loder Cup competition by H. Bennett and Sons. Cockayne (1924) includes an illustration of the hybrid growing at the public gardens in Queenstown. An unpublished

"Complete List of New Zealand Olearias (42) — All of which are growing in some Dunedin Gardens (June, 1925)" does not mention either the botanical hybrid formula *O. ilicifolia* X *moschata* or the epithet *matthewsii*. A search through the extant nursery stock lists and invoices of H. Bennett and Sons for the period 23 August 1897 to 6 February 1935 has also failed to reveal any mention of this plant.

The purpose here is to provide a legitimate name, *O. Xmatthewsii* (Figures 1 and 2) for the hybrid group *O. ilicifolia* X *moschata* and a valid cultivar name, *Olearia Xmatthewsii* 'Highland Mist' (Figure 3), for the particular clone in cultivation (ICNCP Rec.19a). The cultivar epithet 'Highland Mist' was chosen because the appressed white tomentum on the leaves gives them and the bush a grey-white to green-white colour that is reminiscent of the colour of an alpine or highland mist. These two new names are given below.

## New Names

*Olearia Xmatthewsii* Heenan hybrid nov.

DIAGNOSIS: Frutex ex hybridatione *Oleariae ilicifolia* Hook. f. et *O. moschata* Hook. f. ortus, inter parentes intermedius; folia lineari-oblonga, elliptici-lanceolata, elliptica vel ovata-elliptica, marginibus serrato-dentatis vel serrulato-denticulatis, sed dentibus non acutissimis ut in *O. ilicifolia* et foliorum marginibus non integris ut in *O. moschata*.

Shrub originating from the hybridisation of *Olearia ilicifolia* Hook. f. and *O. moschata* Hook. f. Intermediate between parents; leaves linear-oblong, elliptic-lanceolate, elliptic to ovate-elliptic; margins

serrate-dentate to serrulate-denticulate, but the teeth not sharply pointed as in *O. ilicifolia* and the leaf margin not entire as in *O. moschata*.

HOLOTYPE: CHR 468017 A, P. B. Hennan 24/90, Cultivated DSIR Lincoln Experimental Gardens.

OTHER SPECIMENS SEEN: CHR 370557, M. J. A. Simpson 8304 et al., 6 Jan. 1981, Lake Wapiti, Fiordland, 1000 m; CHR 229635, K. Platt, 4 Mar. 1967, Mt Cook, La Perouse.

NATURAL DISTRIBUTION: This hybrid is very uncommon in the wild. The two parent species occupy different habitats and therefore seldom grow together (P. Wardle pers. comm.). *Olearia ilicifolia* grows in lowland to subalpine forest while *Olearia moschata* can be found at a higher altitude amongst montane to sub-alpine scrub (Allan, 1961).

*Olearia Xmatthewsii* 'Highland Mist'

DESCRIPTION: Rounded shrub to 1.5 m tall; branchlets stout, tomentose. Leaves 29-44 X 8-14 mm, elliptic to lanceolate, coriaceous; tip acute; base obtuse to cuneate; margin slightly undulate, denticulate-serrulate; surfaces covered with appressed white tomentum, distinctly so above, thinly so beneath; petioles 4-6 mm long, grooved, tomentose. Capitula 6-7 X 3-4 mm, 10-28 per corymb; peduncles 6-20 mm long, tomentose. Bracts leafy, 4-15 X 1.5-5 mm, with dense white tomentum below, sparse tomentum above; petioles 1-2 mm long. Phyllaries in (2-) 3 series; outer 2.5-3.5 mm long, lanceolate-oblong, tomentose; inner 6.5-7 mm long, linear-oblong; both surfaces sparsely covered with eglandular hairs; margins ciliate. Florets 13-17 (-24) per capitulum; ray florets (6-) 7-9 (-10), white, 7 mm long; disc florets (5-) 6-8(-15). Achenes 3 mm long, ribbed; pappus-hairs slender, white, c.5mm long. Flowering time mid-November to mid-December.

REPRESENTATIVE SPECIMENS: *Olearia Xmatthewsii* 'Highland Mist' is represented in the herbarium of DSIR Botany Institute by CHR 468017 A and CHR 468017 B, the respective holotype and isotype of *O. Xmatthewsii*.

RELATIONSHIPS: This cultivar is most similar to but clearly distinguished from *O. Xoleifolia* 'Oleifolia', *O. Xoleifolia* 'Waikariensis' and *O. Xhaastii* by having denticulate-serrulate as opposed to entire leaf margins. It has been suggested by Allan (1961) that the putative parents of *O. Xoleifolia* are *O. avicenniifolia* and *O. odorata* and for *O. Xhaastii* they are *O. avicenniifolia* and *O. moschata*. Metcalf (1987) in discussing *O. Xhaastii* comments that a species other than *O. moschata* may be involved as one parent.



Figure 1. Two specimens of *Olearia Xmatthewsii* from the Herbarium of DSIR Botany Institute. These two specimens show the wide variation of leaf shape possible in this hybrid group. (Photo. R. Lamberts).



Figure 2. The holotype of *Olearia Xmatthewsii* (CHR 468017 A) taken from the plant of 'Highland Mist' (see Figure 3) in cultivation at the experimental garden, DSIR Botany Institute, Lincoln. (Photo. R. Lamberts).

### Discussion

The lack of early references to the name *O. Xmatthewsii* indicates that this plant was not often cultivated in the years following its introduction to horticulture. It also raises the questions of who the name commemorates and how and when the name originated. It is most likely that the epithet *matthewsii* honours Henry John Matthews (1859-1909) owner of Hawthorne Nursery, Mornington, Dunedin. H. J. Matthews was a keen grower of native plants and collected them from many parts of Otago. A nursery catalogue issued in the 1880's by Hawthorne Nursery lists extensive collections of *Celmisia*, *Senecio*, *Olearia* and *Hebe* (as *Veronica*). In 1900 Matthews left the nursery to become Chief Forester for the New Zealand Government.

Possibly, H. Bennett and Sons were given the plant unnamed (perhaps by H. J. Matthews himself); as they intended to show it at the 1932 Loder Cup Competition it needed a name, so they selected the epithet *matthewsii*. Another possible scenario is that John McIntyre, a foreman of Hawthorne Nursery and a very knowledgeable and competent botanist, collected the plant, and passed it on to H. Bennett and

Sons with the name *O. Xmatthewsii* as a gesture in honour of his former employer. It is important to note that during the late 1890's to the late 1930's Dunedin had a very active, knowledgeable and enthusiastic group of botanists and horticulturists who specialised in native plants. It is therefore highly likely, and not surprising, that Henry Matthews would have a plant named after him by one of his friends (Tom Bennett and Nancy Smith pers. comm.). H. J. Matthews has five other plants named after him with the specific epithet *matthewsii*.

The exact date and place this hybrid was introduced to horticulture is unknown but the illustration in Cockayne (1924, Fig. 1, p.10) gives a clue. This mature specimen at the Queenstown gardens would perhaps then have been 15-18, maybe even 25 years old when photographed. Thus, the plant had most likely been in cultivation since at least 1910 and possibly since even the late 1890's. The absence of a reference to *O. matthewsii* in the "Complete List of New Zealand Olearias (42) — All of which are growing in some Dunedin Gardens (June, 1925)" indicates that it was probably not grown in Dunedin prior to 1925. Therefore, it would seem likely that it first came into cultivation at Queenstown and was possibly collected in the local mountains. When the illustration appeared in Cockayne (1924) the plant became known to Dunedin's horticultural community and was soon introduced to their gardens. Unfortunately it can not be verified that the plant of *O. Xmatthewsii* illustrated in Cockayne (1924) is the same as that grown by H. Bennett and Sons. Likewise, it is difficult to confirm that the plant grown by H. Bennett and Sons or the plant illustrated by Cockayne (1924) is the same as that which is in cultivation today. Historically, many cultivars of garden plant owe their origin to single introductions from the wild so it would be likely that the three separate occurrences of this plant are derived from the one original collection. Therefore, the plant illustrated by Cockayne (1924), that grown by H. Bennett and Sons and that grown in gardens today are most likely derived from the one original wild collection.

### Acknowledgements

I thank Dr Brian Molloy, Mr Bill Sykes and Dr Phil Garnock-Jones for their com-

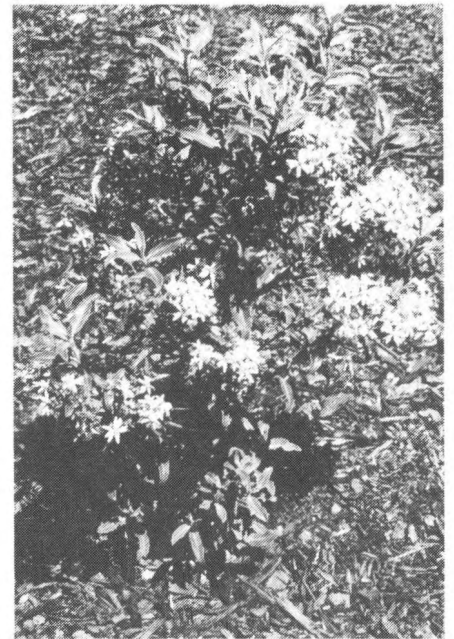


Figure 3: *Olearia Xmatthewsii* 'Highland Mist' growing at the experimental garden, DSIR Botany Institute, Lincoln. The holotype for *Olearia Xmatthewsii* was taken from this plant. (Photo. P. B. Heenan).

ments on the draft manuscript and Mr Tom Bennett and Mrs Nancy Smith for making available to me the nursery records of H. Bennett and Sons. Alison Evans supplied plant material and Dr Elizabeth Edgar provided the Latin diagnosis.

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# Wellington's Town Belt — A People's Park and a Heritage for Everyone The 1991 Ian Galloway Memorial Lecture

Walter Cook

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The Town Belt is Wellington's most conspicuous feature. It affects the appearance of the city from every viewpoint — from the city's approaches along the motorway, from within the central city and from many of the residential areas. Without the Town Belt the appearance of Wellington would, I think, suffer for the worst.

It is also Wellington's oldest planned open space, and along with the layout of its main streets, its oldest surviving historic structure. Many other parts of the city have come and gone, but enough of the Town Belt remains to fulfil its original purpose in establishing the character and limits of the inner city.

Part of the character imparted by the Town Belt results from it being sited on the inner slopes of the high hills surrounding the inner city, and part is due to the plantations on it. Over 120 years of planting has created a significant historic landscape of local and national importance. Central to this process has been the part played by the Botanic Garden. The Garden itself is part of the Town Belt, and today sums up important aspects of the development of the Wellington landscape from pre-European times until the present.

For all of these reasons and many more that I have not mentioned, the Town Belt is one of Wellington's most important public assets.

In August 1839 John Ward, secretary of the New Zealand Company wrote to the surveyor William Mein Smith with instructions regarding the laying out of Wellington. As well as enumerating reserves for cemeteries, public buildings, markets, wharves, boulevards, a park and a botanical garden, he instructed that:

"It is indeed desirable that the whole outside of the town, inland, should be separated from the country sections by a broad belt of land, which you will declare that the Company intends to be public property, on condition that no buildings be ever erected upon it."

The letter concludes with the comment that the Directors "wish the public convenience to be consulted and the beautiful appearance of the future city to be secured . . . rather than the immediate profit of the Company . . ."

The provision of Town Belts was not a tradition common to British cities in 1840. In many of the new industrial cities public parks began appearing as a matter of course only from the 1850s onwards. Town Belts as an element in the theory of modern town planning seem to have emerged in the second half of the 19th century. Cities like London only acquired an all encompassing green belt in the 20th century.

Thus the settlements established on the

New Zealand Company model in Australia and New Zealand were unique for their time in providing this large public amenity. Why this should have been so is a question that interests me, though I have not made much headway yet in answering it. Even so, I think there are general comments which can be made about the question "why".

These are important in considering the value of the Town Belt today, and why it is necessary to provide urban open space for

everyone, and once established why this heritage should be passed on to future generations intact.

An age that believed in laissez-faire economics and the doctrines of Adam Smith would not seem to be a good time to expect far-sighted acts of public welfare on the part of company directors. Then, as now, a society holding these views is more notable for its liberal self interest, which gives great advantages to those who control the means

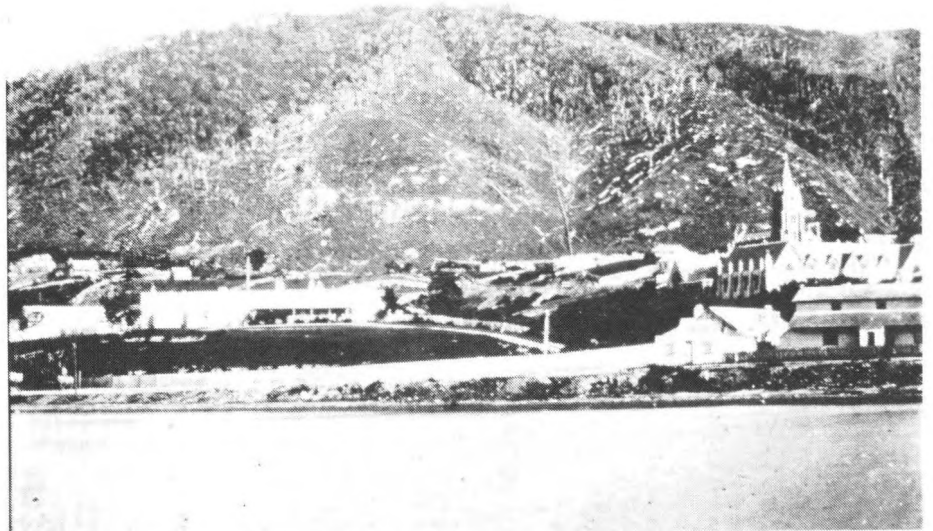


Fig. 1. North-western Town Belt 1867. Central Tinakori Hills showing remains of coastal podocarp forest that covered this area at the time of settlement. In the foreground is site of present Parliament Buildings. Low building on left is Government House, site of Beehive. Photograph: D. W. Davies, Alexander Turnbull Library.



Fig. 2. North-eastern Town Belt 1875. Looking across Te Aro to Mt Victoria. This area was not covered with heavy forest at time of settlement. By 1875 all of the Town Belt had been turned to bleak pasture land. From 1863 large areas were let for grazing. Photograph: James Bragge, Alexander Turnbull Library.



Fig. 3. Central Western Town Belt 1880. The Botanic Garden. The earliest exotic tree plantings on the Town Belt can be seen here. They date from the early 1870s. The Garden also contains the only surviving remnant of native forest on the Town Belt.  
Photograph: Auckland Museum Collection, Alexander Turnbull Library.

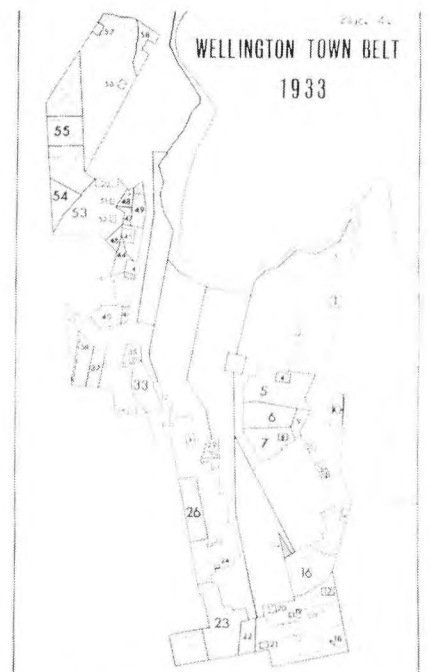


Fig. 4. Map of Town Belt 1933. Red (or dark) areas show extent of major land appropriations from the Belt as at 1933.



Fig. 5. Central Western Town Belt 1932. Anderson Park extension under construction. Providing social welfare has played a large part in shaping the Town Belt. Land has been taken for hospitals, or hills have been flattened in the process of providing outdoor relief. Today the Rose Garden and Begonia House occupy this site.  
Photograph: Evening Post Collection, Alexander Turnbull Library.

of production and wealth and seems to reduce a large number of the rest of the population to abject poverty, long hours of work, squalid living conditions, and a grotesquely inadequate diet.

In Britain the long term effects of a century of living in her industrial cities came home to roost during the recruiting campaigns for the Boer War and the First World War. The mass unfitness of urban recruits suffering from environmental and malnutritional diseases was the real monument to a century of human progress driven by perhaps the most unregulated and freest market economy that the modern world had seen at that time.

The reaction to the negative aspects of the British industrial cities as they developed between 1800 and 1850 began long before these two events of the early 20th century. It is very likely that this reaction was an important factor in the New Zealand Company's decision to provide common land in the form of green belts, for the health and recreation of the inhabitants, around the towns they established in Australia and New Zealand.

Once upon a time the British community had supported common lands which were provided for the use of the people. These resources were an important part in the economy of what was then a predominantly rural

population. Most of these lands had been lost through that process of restructuring the land for profit called enclosure. The destructive ruthlessness of such commercially driven events can be seen in the highland clearances of the 1820s and 1830s. Enclosing landowners simply dumped whole communities, social obligations and bonds of loyalty that were centuries old. People dispossessed by this process went to swell the slums of cities like Glasgow and Manchester, or they emigrated. In the industrial cities life was short and brutal. In the Manchester of the 1820s the average life span of the labouring class was 18 years, and of the gentry class, 36 years.

In the new industrial cities before the 1850s there were few public amenities. Adequate drains, good water supplies, good food for everyone, public libraries, museums, free education, parks and urban common land for health and recreation lay many years in the future. Even when these amenities began to arrive, they did so very slowly and in piecemeal fashion. They were at first often provided by public benefactors or private enterprise. Citizens would need to have been very long lived for the advantages of such amenities to trickle down to most of them.

On the other hand if you were rich the situation might be different. The flight of the wealthy from the city to adjacent countryside has happened ever since cities began. A green belt ensures that the suburban character of part city-part country is retained within its boundaries when the city expands. In places like London there were open spaces and park lands owned by Royalty or aristocrats. There were also recent up-market housing estates like Regents Park which provided common land for their affluent tenants. Though these amenities were restricted to the use of the few they were elements in planned urban environments providing models for what the ideal beautiful city should be like. As the 19th

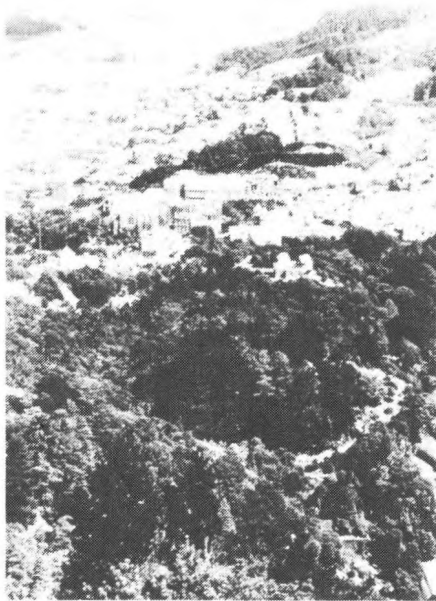


Fig. 6. Western Town Belt 1956. Looking south across the Botanic Garden to Central Park and the Brooklyn Hills. Most of the central area seen beyond the Botanic Garden has been appropriated for the university or as hospital endowment. Photograph: Alexander Turnbull Library.



Fig. 7. North-Western Town Belt 1954. Looking from Mt Victoria to the Tinakori Hills, now covered with plantations established between 1913 and 1940. Photograph: S. C. Smith, Alexander Turnbull Library.

century progressed Royal parks and other restricted open spaces became more and more accessible to the general public.

The New Zealand Company represented an affluent conservative, rather than a left wing radicalism. Their utopia depended on transporting the British social status quo to New Zealand. The provision of and access to parkland was part of the life style expectations of those concerned in planning for the new colony. But the important thing about the Wellington Town Belt was that it was not provided for the use of a privileged moneyed class alone, but for the public in general.

The intentions of the New Zealand Company concerning the Town Belt were reiterated by William Wakefield in a letter to the newspaper in 1843 at a time when Wellington's first town council proposed to lease the Town Belt for grazing. His letter also shows that the Belt had a solid commercial purpose in the Company's plans for the city. It was a hard headed device to limit the number of city sections and retain and increase their value by preventing constant access to cheaper country land on the city's outskirts. Cheap leases on the Town Belt could have the same effect, lowering the value of city sections.

This proposal to lease land was the starting point of two opposed views regarding the Town Belt. On the one hand there were Governments and Councils who thought that the Belt should be managed to produce revenue to pay for its own development. They often represented opinion that also believed that public land should provide sites for social and educational services, even though this meant the legal alienation of land and the destruction of the Town Belt as a continuous parkland around the city.

On the other hand there were those members of the public and public organisations who strongly opposed any use of the Belt in conflict with the New Zealand



Fig. 8. Wellington viewed from Queen's Park, Wadestown 1938. Plantations here were established between 1880 and 1900. Between the tree trunks can be seen in the distance the earliest council planting on Mt Victoria dating from 1880. Photograph: National Publicity Studios Collection, Alexander Turnbull Library.

Company's original intentions, or that diminished its status and use as public land available to all citizens. People holding this view wanted the Town Belt to remain as open space, ornamented with plantations, provided with walking tracks and scenic drives. This view later included the provision of public sports grounds for use by the community, but it did not support leasing Town Belt land to private sports clubs. This, it believed, allowed particular, and often moneyed interest groups to take over the Town Belt and charge the public for access to its own property. The issue came to a head in 1908 when in the face of strong public opposition a bill was passed by Parliament allowing the City Council to lease up to 100 acres of Town Belt land to sports clubs.

That the first view has had considerable success in asserting itself over the last 150 years is embodied in the fact that over one third of the land originally allocated for the Town Belt has been lost. That almost two thirds remains is witness to the determination of the community, and often of its elected representatives, to retain this public open space. But it is also necessary to know that the land has been lost in spite of the stated intentions of the directors of the New Zealand Company and legislation designed to protect the Belt and ensure that it would be held in Trust for the community, for all time. It has always been, and is always possible to pass Acts of Parliament that change the status of the land and thus alienate it

from the Town Belt. This can only be done if the community allows it.

Over the last seven years something akin to the laissez-fair economics and the doctrines of Adam Smith have become popular with those in political power. The idea of public ownership of property has been replaced by the idea of the private ownership of public property for private profit. Where the Government leads, local government will be forced to follow. In the present economic and ideological climate, the Town Belt as publicly owned property could be in danger of once again being seen only as a potential revenue-yielding asset. Whatever the intentions of the Parks and Recreation Department may be, they will ultimately do as they are told by the Council equivalents of Treasury and Ministers of Finance.

That something like the Town Belt is a social and environmental necessity to the beauty and well being of the city and its inhabitants, I suspect, is of small consequence to those holding a philosophy which only acknowledges that people with the means to pay have rights and that they have no responsibility for anyone or anything outside their own self interest.

The Town Belt may not be sold outright, but it could, as it has in the past, be rented to particular interests for uses that exclude or inhibit it being used by everyone. A recent example was the proposal to rent land associated with the site of the old Central Park Hospital to Chase as a commercial camping

ground. It may be possible to rent areas of the Belt to private forestry interests for timber cropping. With the establishment of revenue earning uses, many other values associated with the Town Belt may not even be considered e.g. access for recreation, its value as an historic landscape with all the implications for conservation and continuity contained in this value; its function in the townscape of the city; its biological and wilderness values.

Once narrow uses are established which effectively take over the Town Belt, they are particularly difficult to dislodge. Try getting rid of Government House, Victoria University, or the houses occupying land given to hospital boards.

Ultimately it is the public who own it who must decide that the Town Belt will remain in the hands of the people for use by the people. In the past it has been this determination from within the community that has ensured the survival of a large part of the Town Belt as public open space.

It has been fought for by its constituents. When legislation and the elected representatives of the people fail to protect it, it is only the public wanting the Town Belt, and fighting for it, that will keep it in public hands. And it is only in public hands that, I believe, it has a chance to remain a people's park and a heritage for everyone, now and in the future.

# Climate and Tree Planting Experiences in Central Otago

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The author and his wife (Dr Enny Manning) have spent some 30 years in developing a 6-hectare parkland, Jolendale Park, on Bridge Hill, Alexandra, approximately 200 metres above the Clutha River. This is located in the driest ecological district in New Zealand and the varied topography dominated by picturesque schist rock outcrops provides a fine range of microhabitats for a fascinating collection of introduced tree and plant species. The site has since the mid-Sixties been a recognised study plot by the Forest Research Institute, Rotorua, and the dedication of the site in 1976 as a Private Scenic Reserve ensures that the plantings will have permanency and guaranteed public access. The present article is drawn from a paper presented to the 1990 Biennial Conference of the NZ Society of Soil Science held in Alexandra.

## Introduction

Our tree-planting studies have been closely dictated by the limits imposed by the unique Central Otago climates. The official climate record for Alexandra which dates back to 1923 (rainfall) and 1926 (temperature) has been carefully monitored. The additional elements of wind and evaporation are important to plan survival on this site too.

We have introduced a wide variety of species for on-site evaluation. Over the years we have become better acquainted with important landscape values and those long-term maintenance practices that are both cost-effective and sustainable.

## Critical Threshold Values and Climate Change

The most helpful understanding of climate variables that I have encountered has

been described by a London meteorologist, L. P. Smith (1961) UNESCO.

"For any crop (be it grassland or trees) there are critical climatic constraints and threshold values of which the occurrence of frost and/or persistent drought are simple examples. It is the frequency with which such thresholds are crossed that provides the best index of the effect of climate on a crop. This is especially important when such thresholds are exceeded in successive years, e.g. droughts.

"The nearer a system of land use is to the meteorological limits appropriate to such a system, then the more susceptible it is to small fluctuations in climate. (NB: The problems of grape and cherry growing provide good local examples of this phenomenon).

"This factor is of paramount importance in arid and sub-arid areas and the period of fluctuations that must be considered is no more than the lifetime of a single farmer (or horticulturalist)."

In Central Otago, which will be particularly sensitive to further climate change, the critical threshold boundaries are changing in our own lifetime.

## Central Otago Experiences

Now that we have enjoyed several decades of close field observations and a regular study of the appropriate long-period climate statistics together with the literature on the subject gathered from both within and outside New Zealand we can point to some key issues related to climate change and tree-planting. Some of the climate indices are described below.

## Rainfall

In areas where farming (and horticulture) is of primary importance the *variability* of the rainfall may be critical. This is particu-

larly so in an area of *low rainfall*, where variations from the mean can be of major economic significance. (Maunder, 1970). Incidentally, it should also be noted that even the otherwise beneficial impact of artificial irrigation can be offset by an uncontrolled downpour at the critical time of harvesting.

How dry is Central Otago? Given an index of 100 for the average annual rainfall in Alexandra other centres would rank as follows:

Earnsclough 108  
Cromwell 118  
Patearoa 116  
Ranfurly 131  
Otematata 127  
Bendigo 133  
Roxburgh 162  
Oamaru 176  
Tara Hills 159  
Middlemarch 155  
Lawrence 222  
Queenstown 253  
Wellington 377  
Auckland 377  
Milford Sound 1661

So it is indeed very dry in Central Otago. High rates of evaporation and desiccation by



Fig 1 Younger trees amid rocky outcrops in the Park.



Fig 2 A well grown Eucalyptus

warm winds further accentuate this dryness.

About 80 percent of the growth in most crops (grasses and trees) occurs in the months September to December. Some of our conifers at the Jolendale Park also put on an extra autumn increment of growth in March/April when there are good rains.

In Alexandra, rainfall in an average 'growing season', say September to April, totals about 260mm. But to be effective the rain showers need to be in excess of 10mm. Normally there are about 8 such periods with useful rain totalling about 156mm. That's precious little considering the average raised pan evaporation (about 900mm).

But in droughty years the rainfall received can be much lower still. Growing season rainfall at Alexandra totalled 114mm in 1975/76, 127mm in 1977/78, 131mm in 1955/56, and 139mm in 1963/64. In the latter period Alexandra recorded the lowest ever 12-month rainfall (167mm) ever noted anywhere in New Zealand since records were established.

At Jolendale Park (6ha) we would receive 17 million litres of rain in an average year. A 10mm rain shower would net about 85,000 litres per hectare but much is lost in run-off from the occasional heavy thundery summer shower. The incidence of those showers is very local and often they are tantalisingly close to the park. I estimate that we apply a very modest supplement through hose fed irrigation totalling about 1 million litres per annum — little more than 5 percent of normal annual rainfall.

## Wind, Temperature and other Factors

### Wind

Central Otago is not particularly windy — indeed there are many lovely calm days. The strong dry nor'westers are not as difficult as for many inland sites in Canterbury, Marlborough and Western Southland. But there are occasional fierce storms.

The most difficult wind for us is a persistent mid-afternoon summer onshore wind that whistles through at 25/35km per hour, from 2pm to 8pm with temperatures frequently ranging from 25C to 35C. These conditions are particularly tough on deciduous species whose leaves are not naturally well adapted to such desiccation and fracture. Such winds are very damaging when associated with drought tension.

### Temperature

Alexandra has on average about 140 days every year when the temperature tops 21C. Only Kerikeri in Northland has so many warm days. And in the heart of Central Otago we have about 40 days when the early afternoon temperature tops 27C.

Research elsewhere shows that these conditions place stress on pastoral grazing animals. And so it is with our trees too — more especially the introduced deciduous species whose leaves are desiccated with such persistent dry winds.

Unseasonable invasions by cold air can be equally damaging with radiation frosts occurring within generally mild spells of weather in both the spring and autumn months when plant tissues are not hardened and resistant.



Fig 3 A view in the Park showing well established pines.

### Evaporation

Jolendale Park is located about 200 metres above the Clutha River in what might be described as the 'scabweed' zone. It is exposed to wind from all directions and lies above the river fogs and below the mountain mists. Thus evaporation levels are very high and trees are readily stressed.

### Soils

The predominantly thin soils overlying schist rock have little humus to assist in the storage of moisture when it does fall and they dry out very quickly indeed from October onwards, sometimes earlier. There is also an impermeable 'hard-pan' just a few inches below the surface on better soils inhibiting desirable deep tree root development.

### Biological factors

Apart from climatic factors, biological problems are ever present — rabbits, grass grub, eucalyptus beetle, fiercely competitive weed growth such as early season grasses and invasive sweet brier. It is also probable that helpful mycorrhizal fungi are scarce. Recent studies in South Dakota (USA) have indicated that weed control has been the leading improvement in cultural practices. Weeds 'rob' the crop of moisture, nutrients and light. The loss of these essential ingredients is important every year. It is critical in drought years. (Cholick, 1989).

### Selection of Trees under Study

There are now some splendid trees on display in the park. Highlights include the snow gums, the ornamental cedars, the blue firs, the flowering apples, the Manna ash, and a wide range of junipers. The following is a brief selection of species to be seen at Jolendale.

#### (1) Conifers

*Abies* spp incl. *A concolor*, *A magnifica*, *A pinsapo*

*Cedrus* spp incl. *C deodara*, *C atlantica*

*Cupressus* spp incl. *C arizonica* cultivars

*Juniperus* spp a wide range of trees and small plants ranging from ground hugging creepers (*J sabina* tamariscifolia, *J x media* pfitzeriana aurea, *J horizontalis* douglasii) to larger trees (*J virginiana*)

*Larix decidua*

*Picea* spp incl. *P omorika*, *Picea pungens* glauca

*Pinus* spp incl. *P coulteri*, *P pinea*

*Sequoia* spp

(2) Deciduous

*Betula* spp

*Elaeagnus angustifolia*

*Fagus sylvatica* 'purpurea'

*Fraxinus* spp incl. *F excelsior* 'Raywoodii', *F ornus*

*Sorbus* spp incl. *S aucuparia*, *S discolor*, *S hupehensis*

*Malus* spp incl. *M coronaria* 'Charlotte', *M profusion*

*Populus* spp

*Quercus* spp incl. *Q cerris*, *Q coccinea*, *Q ilex*, *Q macrocarpa*, *Q palustris*, *Q rubra*.

*Rhus typhina*

*Syringa* spp

*Salix* spp

*Ulmus pumila*

(3) Evergreen

*Acacia* spp incl. *A pravissima*, *A baileyana*

*Arbutus unedo*

*Eucalyptus* spp incl. *E delegatensis*, *E gunnii*, *E niphophila*, *E pauciflora*

*Nothofagus fusca*

### Effects of Climate Change

An awareness from experience of the possible effects of climate change has prompted my long interest in climate change, particularly the impact of sunspot cycles, the Southern Oscillation (El Nino and La Nina), and the 'greenhouse' effect.

Examination of instrumental records over 50 years indicates that the most striking factor is undoubtedly the warming of our winters. It seems likely that there has been some relaxation of the westerly winds in the equinoctial seasons. This can result in more out of season southerly outbreaks — often not very moist by the time they reach Central Otago but normally accompanied by a sharp drop in temperatures (dry cold fronts).

Our more useful rains that bring effective moisture for trees come from well developed frontal troughs that stretch from Central Australia to Campbell Island. They are



Fig 4 Smaller broadleaf trees with a background of larger pines.

accompanied by high vertical cloud activity that is not so much influenced by the rain shadow effect of the main divide. We've been having precious few of these systems of late. Major flood events did however occur in 1978 and 1980 when the Clutha experienced near record flooding in Queenstown and West Otago.

In a previous paper (Manning, 1978) I showed a distinct link between persistent above average rainfalls in the Clutha catchment and the more active phase of the 11-year sunspot cycle. We have just passed through such a peak in the current cycle.

And while we could have done with more rainfall in Central Otago, Milford Sound did have an all time high of 10 metres of rain in 1988.

#### Discussion and Conclusions

The above described factors and others all come more sharply into focus when you are growing trees and plants in a very marginal climate. They directly limit the range of species that might be established on the more difficult sites in Central Otago that lack good shelter and augmented irrigation.

The effect of seasonal climate changes is more noticeable.

Thus Central Otago provides an excellent outdoor laboratory for those interested in the various earth and atmospheric sciences. There is easy access to the critical physical boundaries, distinctive eco-systems and climatic thresholds. The gradient between the driest and wettest sites in New Zealand is particularly steep. It is not surprising therefore that so many of our more notable New Zealand scientists have enjoyed a few years in the field in Central Otago — a valuable experience in understanding key environmental factors.

We have now worked with hundreds of exciting tree and plant species and read extensively of overseas experience in similar conditions. More important, we continue to meet on the site a succession of very interesting horticulturalists and share something of their knowledge and advice. Our sensitivity to landscape values has been enhanced. We also have a better understanding of ongoing maintenance requirements for man-made parks. A growing number of New Zealand farming families and others are today enjoying similar experiences.

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# The Development of Arboriculture in New Zealand

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## **Tane-Mahuta, God of the Forest**

Before looking at the 19th Century development of arboriculture, it should be noted that the Maori had a deeply ingrained love of and respect for trees.

A little more than a thousand years ago New Zealand was populated by the Maori people who, despite their ferocity in battle and thirst for conquest, revered the trees of their land as sacred providers of so many of the necessities of life. The protection of the trees was ensured by tapu. The dense forests were the realm of Tane the fertiliser, Creator of all life, who in his guise as Tane-Mahuta, God of the Forest, created all the trees and vegetation which clothed the land.

Tane was said to have produced the trees of New Zealand during his search for the female element by which he could produce mortal man. His search led him to cohabit with many supernatural beings and before he succeeded in producing *ira tangata*, mortal man, in the true form of a woman, he created the trees which clothed the land.

Because of the belief that men and trees shared a common ancestry, the Maori of old felt an affinity for trees rare among other races. When they entered the forest they knew that the giant trees which towered above them were part of a family to which they were related. Therefore, they did not attempt to take anything from the forest which was not essential, and when needs necessitated the felling of a tree, it was only done after performing certain rites.

## **Development in New Zealand during the 19th Century**

New Zealand has been very much influenced by the Europeans, especially the British. Visits to gardens and arboretums are a classic example of the way horticulturists and town planners have been influenced. A very good example of this is Hamilton East with a tree-lined main street, with criss/cross street patterns and central green with a periphery of mature oaks. Many other examples could be added.

Winsome Shepherd and Walter Cook describe the development of horticultural education which includes tree care. Change began in the 1920's, but it was only after the Second World War that New Zealand developed beyond a state of colonial dependence on Britain in this matter. (Shepherd and Cook 1988).

One of the social phenomena of the late 1960's was a complete change in attitude within the community to horticulture. This was brought about by the movement towards ecology and advancements overseas. Over the years two organisations, the Royal New Zealand Institute of Horticulture and the Institute of Park and Recreation Administration, have been instrumental in transforming gardening into Amenity Horticulture — a multi-faceted profession designed to meet modern demands. During the early 1970's courses in Amenity Horti-

culture were offered at Massey and Lincoln College. Although not specialising in Arboriculture some areas were covered.

## **20th Century Development**

With this cultural heritage behind us, how have we managed our trees? From the perspective of our native forests we are following world trends. Today we are caught up in a whorl of pollution — air, water, land and mind, conditions brought about by an affluent society concerned about monetary gains. There is also the havoc caused by gigantic industrial military complexes necessary to satisfy the needs of an expanding community following a constant growth economic philosophy.

In the urban treescape city fathers have supplied some wonderful parklands — Christchurch with Hagley Park, Wellington's Green Belt and the Auckland Domain. However much has been lost through development and in the preceding time apathy has led to poor tree management.

The increased stress within our urban areas has created a greater awareness of the importance of trees — in doing so this has exposed the need for qualified arborists.

The following chronology gives details of some of the people who have influenced and advanced the study of Arboriculture in New Zealand.

Christchurch City Council was the first City Council to recognise the importance of having an arborist on staff; this was undertaken mainly because of the Town and Country Planning Act, 1973. This Act provided the authority for Council to protect trees, through District Schemes, and, as a result a major objective of Council was to survey the whole city. This task was beyond the scope of existing staff and it was decided in 1974 to appoint a qualified person. It was then Mr Walter Fielding-Cotterell took the first position in New Zealand as Arborist for Christchurch City Council.

Although much of Fielding-Cotterell's attention was given to town planning and tree protection work, he was soon to have a major influence in the correct pruning of street trees with the removal of the "Pollarding regime". He was also responsible for training staff and demonstrating safe climbing techniques.

In 1975 Lincoln College horticulture lecturers, John Taylor and Roy Edwards, assisted in the field by Walter Fielding-Cotterell, gave a four day block course on tree maintenance. This was made into a booklet which was published under the sponsorship of the NZ Institute of Park and Recreation. It has been a very helpful guide to many Councils and individuals. (Taylor and Edwards 1976).

In 1976 Ian Crossman set up the Shady Tree Company, one of the first professional organisations. Ian had completed his training at Merristwood Agricultural College

and realised the need in Auckland. He trained Alan Parker who now owns and runs the business today.

In 1978 John Wakeling arrived from England with a wealth of experience from Europe and America and promoted skills to the Palmerston North and Henderson Borough Councils.

1979 saw the employment of Bob Cowan as arborist based at the Forest Research Institute. He used Taylor and Edwards' Tree Maintenance booklet, and pamphlets published by the Forest Research Institute for reference using the concept of not breaking the branch collar. Bob had forestry training and is still practising his skills with the Institute in Rotorua.

1979 also saw the arrival of Frank Buddingh from Holland to take up a position with the Dunedin City Council as Arborist. Frank, a Fellow of the Arboricultural Association of England, spent many years working with trees in Holland. He has put a lot of energy into tree maintenance courses, and a great deal of effort in promoting tree care. Presently he is still active as a proprietor of NZ Tree Care.

The author joined the Shady Tree Company in 1979 and a concerted programme was made, especially around the local authorities, explaining the concepts of Arboriculture. In 1982, at the NZ Institute of Park and Recreation Conference in Nelson, a demonstration of Climbing Techniques and Tree Surgery was given which caused a great deal of interest and feedback.

During the 1980's several New Zealanders attended Merristwood Agricultural College, coming back not only with qualifications but also work experience.

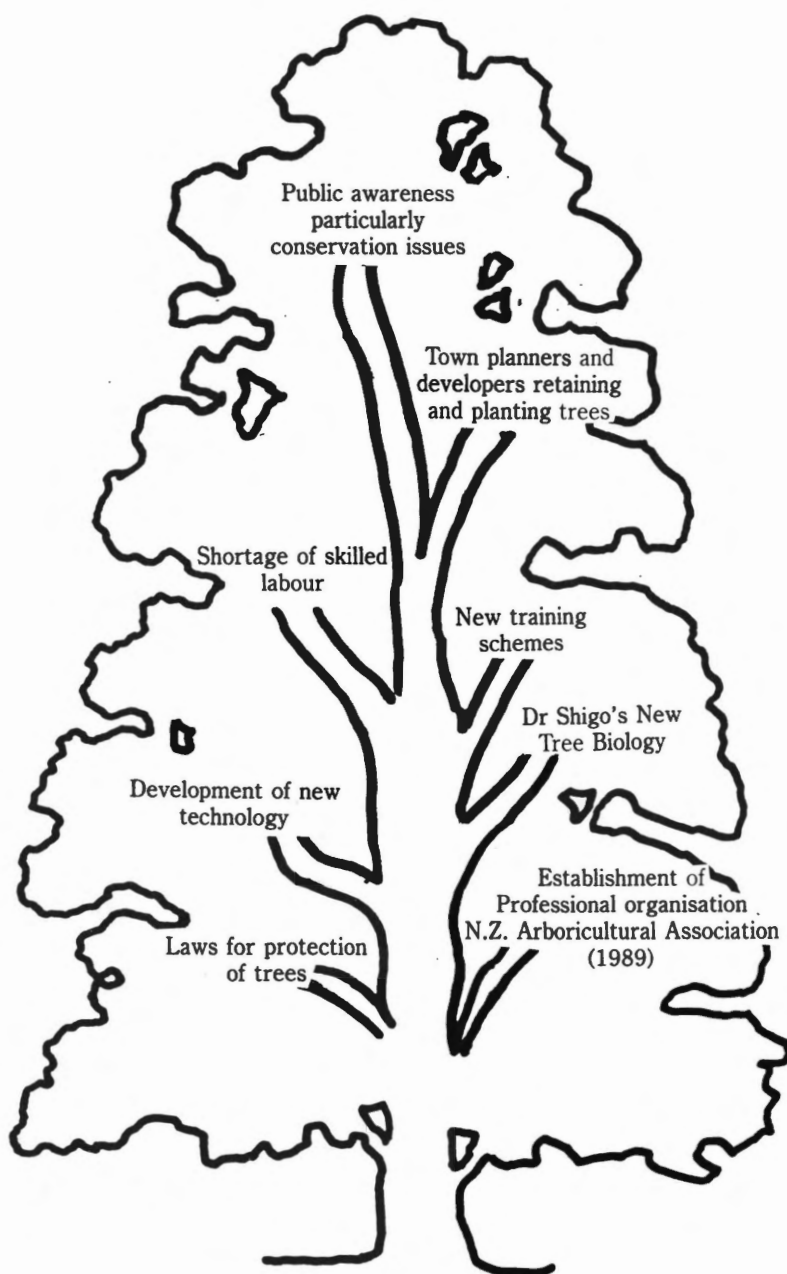
Another Auckland company, Treescape, which Eddie Chignell operates, is one that attains a very high standard of craftsmanship. It was Eddie who organised the visit of Dr Alex Shigo in January 1989. Dr Shigo has had a profound effect on the arboricultural industry throughout the world.

Education has been a big factor. Ian Gear, Head of the Agriculture and Horticulture Department, Waikato Polytechnic, was the instigator of New Zealand's first course in Arboriculture.

The course was put together with Ian Gear being the facilitator, with the criteria based on information supplied by the author and representatives of the industry, Alan Parker and Eddie Chignell. It was realised that the course should have a major practical component and so the first course was designed as a Craftsperson's Course. The first course commenced in July 1988 with John Wakeling assisting me with the teaching of fifteen students from all parts of New Zealand.

Finally, in October 1989 at a workshop on Arboriculture held at the Waikato Polytechnic, it was agreed that a national body was required. This saw the setting up of the





Showing development of Arboriculture up to the present day

New Zealand Arboricultural Association (NZAA).

#### Current Events

With the rapid development over the past several years the arboricultural industry is beginning to form into a more organised profession. However, there is still much work to be done, especially in the areas of education, public awareness, tree conservation, safety practices, correct tree maintenance and tree planting.

Here is a brief description of some of the more important factors which are being addressed during the 1990's.

1) A Guide to Safety in Arboriculture  
This is a code of practice undertaken by the Occupational Safety and Health Department, part of the Ministry of Labour. (Safety Code for Bush Undertakings 1988).

A first draft was circulated and discussed during the Arboricultural Workshop at Waikato Polytechnic in October 1989 and a second draft completed in December 1989.

These guidelines had specific areas involved in arboriculture, such as tree climbing techniques and the use of a chainsaw off the ground.

The first draft was given a reasonable reception. Some specialist areas such as climbing techniques required input from professional arborists. A policy statement issued in late 1990 by the Occupational Safety and Health Department acknowledged the importance of involving the industry more in such developments. This document is not to be a Statute Law but will give the industry guidelines which can be monitored by Occupational Safety and Health bush inspectors and will also act as a precedent in a Court of Law should someone be found negligent in the event of an accident. Funding has been made available to produce written material on safety in arboriculture by December 1991.

2) The Resource Management Bill  
Tree protection is very much part of the arborist's responsibility. At present there

are many laws governing the preservation of the tree in the urban environment. The Resource Management Bill was introduced in 1989 and brings together 52 Resource Management Acts under one law. Submissions in early 1990 were made to the Select Committee. It would be appropriate to see that all planners and developers have a standard criteria for the protection of the urban tree, based perhaps on tree evaluation as set out by the RNZIH Notable Trees Committee.

The Notable Tree Register developed by the RNZIH has designated Tree Officers in the main cities, responsible for recording specimen trees of particularly high amenity value. This does not place these trees under any law or covenant but creates awareness and response.

The Waikato Polytechnic continues to offer the 20-week Craftsperson's Course, as well as short courses of one week. It is hoped that it will continue to attract councils, utility companies, commercial companies and other interested parties.

The NZAA held its first Conference in Nelson in May 1990. This will be an annual event, a chance for arborists to discuss their ideas and problems. Workshops and specialist speakers will also be on hand. Through the duration of the Conference feedback from the industry will direct many of its objectives for the future.

#### Future Situation

The implementation of the Occupational Safety and Health Code of Practice and the work of the NZAA will encourage all personnel to pay attention to training. It should be noted that the image of the profession is formed to a considerable degree by the quality of the people attracted to the industry.

To keep pace with technical aspects of the industry, further courses should be designed in such areas as computers, tree surveys and design concepts. The future will demand attention to business arrangement, especially as we see major changes occurring in the local authority sector. In the authors view any town with a population over 50,000 should have in the future an arborist. If Councils have to call on a contractor then they should be on an approved list, as directed by the NZAA.

The approved list could be based on the same principle used in Britain, whereby a list of approved contractors is set up and made available to local government and the general public. The basis for admittance to the list would be an appropriate knowledge of arboricultural principles, and the attainment of a required standard of work. The work would be judged by a professional sub-committee of the NZAA. This approved list would have the effect of increasing the standard of craftsmanship and level of expertise and would go a long way in protecting the urban tree.

The Arboricultural Association has set up a Committee to produce a draft code of practice for arboriculture in liaison with the Department of Occupational Safety and Health.

In the future, arborists will need to give more attention to quality — quality of

plants used, quality of equipment and supplies, and the quality of the service rendered. Quality of plants perhaps tops the list. Many of our arboricultural operations are required as a result of poor quality plants. Much of the pruning, cabling or removal is due to poor plant selection. Select the plant to fit the need. We will need many more cultivars to satisfy the requirements of the environmental changes that will be brought about by new concepts in urban development.

One area which the industry should support is Arbor Day which had its centenary in 1990. The schools are usually given great attention on this day, however, arborists should not only encourage children to look at their treescape, but factory owners, corporations and farmers should do likewise.

From a more scientific point of view, Dr Shigo's concept of looking inside the tree and understanding how a tree functions must continue. There is a new awareness

and concern for our trees, with interests and pressures coming from many sources for help for our trees. This is good, but the arborist must be ready to meet the new demands.

In the realms of crystal ball gazing, Dr Shigo envisages that the future will see small electrical gadgets and sensors in trees capable of receiving signals on the electrical changes in the tree. Such sensors could be attached to the trees and then send signals to a computer which will unscramble the information and give a printout. Printout on pests, disease and stress could show up as the early warning system of the future.

#### Conclusion

In New Zealand we are now establishing Arboriculture on stable ground. Education is the key. Public awareness of the importance of preserving and maintaining a green environment is the treasure which the key can unlock.

A professional image must therefore be established. Upgrading cannot be done at the top only, it must consider the whole echelon of personnel.

This means arborists must make a commitment in practices accruing to its betterment. As Chadwick, the American arborist and educator, said to his students.

"There are two ways to get to the top — you can climb the tree or you can sit on the acorn and wait for it to grow."

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## Sir Victor Davies Award

The Sir Victor Davies Award is an annual award made to a person under the age of thirty years who has demonstrated an outstanding plant knowledge in New Zealand. This may involve different aspects — propagation and production, cultivation, preservation, botanical study and research. It was first awarded in 1990.

The recipient of the 1991 Award is Vance James Hooper, Duncan and Davies Nurseries, New Plymouth.

#### Citation

On leaving school, Vance James Hooper began an apprenticeship with Duncan & Davies Nurseries in May 1979. He was the top Taranaki apprentice in the Trade Certificate for 1981 and was awarded the Duncan and Davies Rose Bowl.

He has shown outstanding interest and skills in various aspects of plant propagation especially bud grafting and has helped pioneer the implementation of new methods into the firm's production system — modifications of chip budding techniques to substantially improve results with some difficult deciduous crops, adopting subtle changes to summer side veneer grafting to improve production methods with other difficult subjects.

Other areas of bud grafting that Vance has been largely responsible for improving, to fit modern production schedules, have included magnolia chip budding techniques both seasonal and at extraordinary times, resulting in markedly improved crop yields. This led to the development of a method of bud grafting *Michelia doltsopa* to provide a suitable export product which could be produced economically.

Vance has researched the use of magnolia understocks used in commercial horticulture in New Zealand and has been responsible for evaluating and selecting reliable clonal understocks with definitive characteristics. Two new clones have been selected specifically for use as understocks by the nursery.

Vance is a skilled plantsman with keen perception and sharp observation skills. This has enabled him to recognise many sports and seedlings on the nursery which are being propagated and evaluated for possible introduction to the nursery trade. The first of these was *Gleditsia triacanthos* 'Emerald Cascade' which he first selected as a seedling from a crop of understocks in February 1981. It was commercially released in 1986.

Over the past four years he has worked in

the New Developments Department of the nursery where he has put his grafting skills to work successfully with imported scion wood which has been quarantined in open ground quarantine beds, using Duncan and Davies nursery grown understocks. With regard to new varieties of bud-grafted deciduous plant material, he carries out the necessary trial work to decide the best understocks to use and also the most successful budding method and the best timing of the operation.

He has also studied the growing habits of a batch of variegated *Cordyline australis* hybrids. This has enabled him to develop new methods of vegetative propagation to allow a faster build up of these exciting hybrids. He also raised a batch of seedlings from one of the above clones and there are two or three forms which are showing some very useful ornamental characteristics.

Some of the other plants of possible horticultural merit include a new blue/green dwarf selection of *Ginkgo biloba*, a variegated *Michelia doltsopa* 'Silver Cloud' (both of which he selected), and he is also propagating a unique variegated form of *Acer palmatum* 'Atropurpureum' which was found in 1989.

# Growth of Redwoods in New Zealand

A. L. Elwood-Smith

46 Hampden Street, Picton

Californian redwoods are amongst the best known of the world's large trees both for their height and diameter. Two closely related species are the famous *Sequoia sempervirens*, the coastal redwood, and *Sequoiadendron giganteum*, the Big Tree. In their native habitat they are magnificent trees and their forests form one of the prominent tourist attractions of West Coast America.

Their generic name derives from that of a Cherokee Indian called Sequoyah. They are long-lived trees with ages up to around 2000 years being recorded for *Sequoia* and 3000 years for *Sequoiadendron*. Seed and plants of both species were distributed around the world last century with trees first arriving in New Zealand by ship from England. However, subsequent growth performance in some regions in New Zealand as mature trees has been poor and it is interesting to review the reasons why. The author has had a particular interest in observing tree performance in the Canterbury and Marlborough districts of the South Island.

## Natural Habitat

*Sequoiadendron giganteum* inhabits the western slopes of the Sierra Nevada from Placer County (south of Lake Tahoe) to Tulare County in an interrupted belt of about 402km at an altitude of 1234m to 2430m.

*Sequoia sempervirens* inhabits the humid coastal line of approximately 725km long and 32km wide, extending from the State of Oregon to Monterey County in Southern California.

In the Klamouth area of the Divide which runs through the State of Oregon and Northern California and continues on down through Idaho and Texas, the mountainous section called Russian Heights has one of the largest number of cone-bearing species (17 out of 20) known to occur in North America, all found within 1km of the "Heights". More conifers and liliaceae species occur in this section than any comparable region on Earth.

Calaveras Grove, in Big Tree State Park, represents the northernmost limit of *Sequoiadendron giganteum* and contains a number of very fine specimens named after famous Americans. Unfortunately the most famous of all these trees has since died but many remain healthy in Sequoia National Park.

A fire which devastated part of the Sierra Nevada came within 1km of the Calaveras Grove before heavy rainfall finally extinguished it. The firefighters' normal methods of control, using bulldozer, helicopter and water pumped where available from rivers and lakes, proved to be useless in the circumstances.

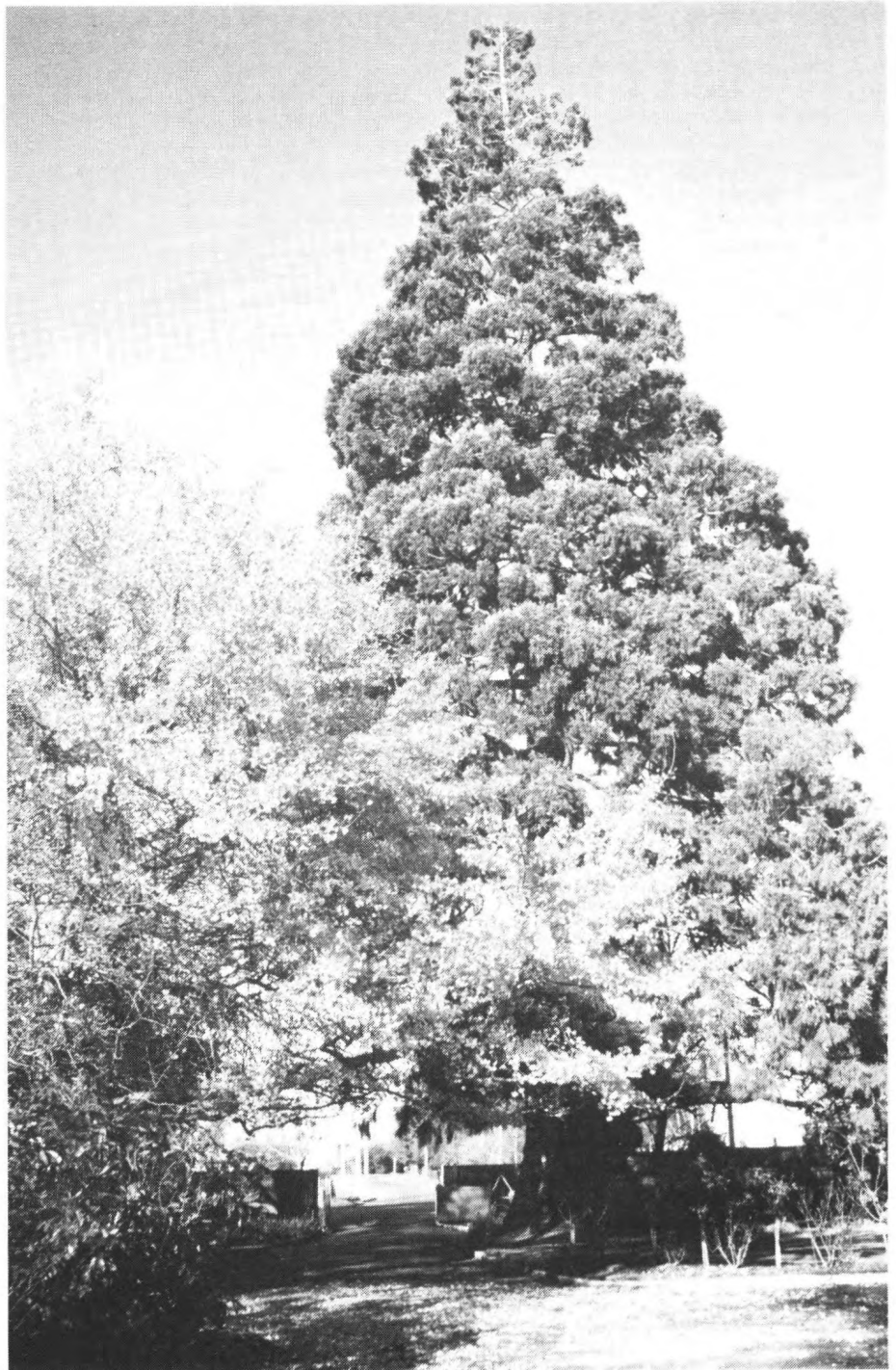
The two departments responsible for the control of this wilderness have been forced to rethink their methods in an area subject

to naturally induced fires — combustion in dry material such as pine needles etc, and lightning strike. Containment of such fires must be a priority. Then natural fresh seed propagation and dispersal can re-establish the forest growth.

Of great importance to the health and growth of *Sequoia* and *Sequoiadendron* is the Japanese current called the "Black Stream" by oceanographic scientists. This current sweeps across the Pacific in a north easterly direction in an immense arc, mingling with cooler waters of the Oyashio

Current moving down from the Okhotsk and Bering Seas and influencing weather patterns on the Pacific North West Coast of America. Flowing south it brings rain to the Oregon and Californian coasts including the well known rain fogs of the San Francisco Bay area. South of this the current then sweeps 9000 miles back across to the deep off the Phillipines.

The current has a considerable effect on the Sierra Nevada by bringing between 4000-6000mm of rain a year. It is the longest east-west oceanic drift in the world



A redwood tree with top branches torn out by strong winds.

with an average movement of ten to fifteen miles or more a day. Well authenticated evidence of this current is the infusion of Japanese blood which has become evident in the North Western Coastal tribes through fishing boats and others unfortunately caught in its drift.

The influence of this current leads to a humid strip approximately 450 miles long by 20 miles wide confining *Sequoia sempervirens* to moist bottom lands extending from South West Oregon to Monterey County in Southern California, giving heavy fogs in this stretch of coastline. Usilamar on Monterey Peninsula, a seaside resort, is accepted as the most southerly point where a mixture of both redwood and Monterey pine exist.

The area in which *Sequoia sempervirens* exists is protected from strong winds which are detrimental to its growth, causing damage and dieback to the leader shoot. The *Sempervirens* species at one time extended to West Greenland and South West China. Now only isolated groves are to be found in Oregon State, mostly on wet bottom land, but these are of immense size and very dense stands.

*Sequoiadendron giganteum* enjoys conditions on the western side of the Sierra Nevada at 4,300 to 8,000 ft, this optimum height giving it an important advantage. At this elevation it enjoys even rainfall with humid conditions and its growing tip is constantly bathed in cloud. Winter conditions, although not severe, can leave a depth of snow between 300mm to 600mm in 3 to 6 months of the year and often during this period temperatures fall below zero. Many trees in this area have obtained heights up to 280ft and maximum diameters up to 40ft.

It appears likely that stress on the growing tip from exposure or lack of humidity is the dominant factor in the response of trees to unfavourable climates.

In New Zealand, it is evident that the above factors and conditions are not found in areas such as Canterbury and Marlborough for any length of time. The conditions, alternating between favourable and unfavourable periods, are too severe on growth of redwoods. Obviously the taller these species grow, the greater the demand on ground water and exposure to overhead conditions, these being very dissimilar in these New Zealand regions to those in their natural habitat.

### Distribution and Growth in New Zealand Areas

Most trees arrived in this country in the 1800's by sailing ship, suffering difficult conditions during the voyage, including shortage of water, a sharp contrast to the conditions in the established nurseries in England from whence they came. It is remarkable that a number of these specimens still exist in New Zealand today. Later in the 1800's to early 1900's Tasmania and New South Wales were the source of supply for plant stock which reduced time and travel conditions to a minimum.

One of the nurseries in the South Island responsible for distributing many trees and shrubs, was Landers in North Canterbury. After Mr Lander's death, his garden supply warehouses in both Dunedin and Blenheim were closed down in the late 1910's and early 1920's. Many letters were found in his old homestead which told sad stories of non-arrival of stock from England or the death of specimens on their voyage to New Zealand, leaving many potential customers disappointed. The other nursery which had an impact on the Marlborough area was Hales' Nursery in Blenheim — his name is still well known to people in that area.

For some time now attention has been drawn to the evident stress shown by trees of the two species in Canterbury (trees in the Christchurch Botanic Gardens and Lincoln College) and a single tree in Seymour Square, Blenheim.

In the late 1960's many other specimens began to show signs of the effect of severe conditions. It is obvious that both species are greatly affected by north westerlies and the change in climatic conditions, along with rainfall, which appears to vary for periods of seven or eight years in a time phase of twelve to fifteen years on the east coast of the South Island.

In Canterbury, rainfall in the 1960's averaged approximately 600mm per annum but dropped to 300mm in 1971-72. These dry conditions ended with a sudden increase in rainfall which commenced in May 1973, lasting a full year. Snowfall on the Main Divide also varied greatly during this time. The increased rainfall in 1973 appears to have had an even greater effect on both species in the Canterbury region and the death of trees over a period of time proved to be a bitter disappointment to many horticulturists. Indeed many local horticulturists are

now of the opinion that 100 to 130 years is probably their life expectancy. Perhaps we expect too much of both these redwood species, to exist in entirely different conditions to those of their natural habitat.

It is of interest to note that in the South Island four specimens in excellent condition remain at Lillybrook Reserve, Rangiora. Of the six *Sequoiadendron* planted by William Dart in Picton in 1863, two have completely disappeared; two have since been cut back at their tops and two only remain in good condition. These last-mentioned two are growing on Nelson Square and are magnificent specimens, suggesting again that humidity, low cloud for most of the winter and high rainfall can only improve growth in this species. Several other good specimens can also be found growing in Nelson and Blenheim, but the question remains is their life span limited owing to their having reached that height when conditions affect their tip.

Of special interest is the study of the growth of *Sequoia* which were established by the New Zealand Forestry Department at Silverdale, north of Auckland City on the Main North Road to Whangarei. Over the period of my observations, phenomenal growth has occurred which would cause one to think deeply on the implications. High humidity from the proximate closeness of both the Tasman and Pacific Oceans is obviously of great importance, as optimum conditions, with typical 1400 to 1500mm of yearly rainfall, is similar to their habitat, without snowfall on the higher elevations. The surrounding hills also give an important protection from strong winds, which of course, are not dry. Advantage is also gained by not having climatic variations. While these trees are comparatively young, early growth suggests that there may be local climates in New Zealand more favourable to growth.

The Great Barrier Reef current which flows across the Tasman also has a bearing on humidity as it continues down each side of the North Island — on the east coast, ending off Hawkes Bay and the west between Greymouth and Hokitika.

These general observations suggest that there are definite climatic limitations to long term growth of these large redwood species in drier regions of New Zealand. Certain areas, e.g. parts of north Auckland, however, may provide conditions better suited to growth and longevity of trees.

# Royal New Zealand Institute of Horticulture Citations for the Award of Associate of Honour AHRIH (NZ) 1991

## MURIEL ETHELWYN FISHER

Muriel Fisher has had a love for New Zealand native plants ever since her school days at Queen Margaret's College, Wellington. She began collecting an herbarium in 1931 and from an early age wanted also to grow native plants, a desire that was inspired in part by the establishment of the Otari Native Plant Museum. She was unable to go to University to train as a botanist, but she was a foundation member of the Wellington Botanical Society and collected plants while on tramping trips in the Orongorongo and the Tararua.

Mrs Fisher moved to Auckland in 1943. She married but was soon left a widow with two small children, and in 1949 took up school teaching. Ever since then she has worked tirelessly to instil in children a love for native plants. In 1952 she remarried and her new husband, Mr William Fisher, was likewise an enthusiast for New Zealand plants. On their property 'Fern Glen' at Kauri Point, Birkenhead, the Fishers built up an extraordinary collection of more than 700 native plants, including over 100 ferns.

They did far more, however, than simply grow plants — they wanted to encourage other New Zealanders to take an interest in our native flora and this inspired their association with many local societies. Thus they were both keen members of the Auckland Botanical Society and the Royal Forest and Bird Protection Society. Mrs Fisher served as a secretary of the North Shore Section of the Royal Forest and Bird Protection Society and then as a National Councillor of the Society. She also worked hard for the Association of Junior Naturalist Clubs, the Holiday Playground scheme and the Girl Guides. In all these activities Mrs Fisher encouraged children to become interested in our native plants.

Mrs Fisher and her husband gave hundreds of trees and shrubs for planting at schools and public reserves. They were always generous with their time and in donating plants, but with the increased public interest and the increased public demand decided to establish a native plant nursery at 'Fern Glen'. This was one of the first nurseries devoted entirely to New Zealand plants.

In the mid 1960s Mrs Fisher gave up teaching and started a second, remarkable career of promoting native plants for gardens. Together with Betty Satchell and Janet Watkins, she wrote *Gardening with New Zealand Plants* and this was followed by *New Zealand Ferns in Your Garden* (with Lal Ward), *Gardening with New Zealand Ferns*, and (with Elaine Power) *A Touch of Nature*. These books have done much to encourage the wider use of our native flora.

In 1970 Mrs Fisher and her husband were jointly awarded the Loder Cup which, according to the inscription engraved on the cup is "offered to lovers of nature in New Zealand to encourage the protection and

cultivation of the incomparable flora of the Dominion". It is difficult to imagine a more fitting summary of Mrs Fisher's lifework. In 1988 the Queen's Service Medal was conferred, once again in recognition of her work for New Zealand plants.

Mrs Fisher now has another battle: to ensure that 'Fern Glen' can be protected for future generations of Aucklanders.

Muriel Fisher has, through her love and enthusiasm for our native plants, made a lasting contribution to horticulture and to gardening in New Zealand.

The National Executive is pleased to award her the Associate of Honour of the Royal New Zealand Institute of Horticulture in 1991.

## ALICK LINDSAY POOLE

M.SC., B.FOR.SC., N.D.H.,

F.R.I.H., F.R.S. (N.Z.), C.B.E.

HON. FELLOW BRIT. INST. OF  
CHARTERED FORESTERS

On leaving school, aged 17, Lindsay Poole worked as a State forest trainee for 12 months before entering the Forestry School at Auckland University in 1927. On completion of his degree in 1930 jobs were scarce and for four years he had miscellaneous forestry jobs including working in the forestry Waka nursery as well as in a general nursery, Wytchwood Nursery in Rotorua. He came to Wellington in 1936 and under C. M. Smith served as a forestry labourer until 1937 when he joined the staff of Botany Division, DSIR. At first he worked on ragwort control, then with the outbreak of war and the curtailment of hemp from India he was engaged in development of flax (*Phormium*) fibre as a suitable alternative for wool packs. Considerable work was done at the Eastern Flax Estate near Levin and Lindsay completed a thesis on flax forms from the Hauraki area. He was awarded the R.N.Z.I.H. National Diploma in Horticulture as a result of his previous nursery experience and this thesis. Wool packs were eventually made from flax fibre but when war ended a return to the use of the customary hemp was resumed. Lindsay still maintains that research should have continued and still should continue to improve the flax fibre and so establish a much wider use for this plant species.

During the war, from 1940 to 1947 Lindsay was commissioned, serving with the 2nd N.Z.E.F. Forestry Company, England. At the same time from 1941 to 1945 he was Scientific Liaison Officer at the New Zealand High Commission, London. In 1946 he served with the Forestry Timber Control Section in Germany.

Returning to New Zealand in 1947 and back with Botany Division, Lindsay attended Victoria University gaining his M.Sc. He was appointed Assistant Director, Botany Division, D.S.I.R. and two years

later was appointed Director. In 1951 he was appointed Assistant Director of Forestry, New Zealand Forest Service, a position he held for ten years before being appointed Director General of Forests, New Zealand Forest Service, in 1961. He held this position until 1971.

In 1959 he was elected as a Fellow of the R.N.Z.I.H., in 1962 a Fellow of the Royal Society of New Zealand and in 1971 he was awarded the C.B.E.

From 1971 to 1978 Lindsay was Chairman, Soil Conservation and Rivers Control. In his so called retirement years Lindsay remained always active publishing much valuable work and continuing his link with Forestry and Water and Soil conservation.

Lindsay Poole's publications are impressive and he was written over 100 articles, books and scientific papers. His early association with horticulture in the Rotorua Nursery was never forgotten and in 1963 in conjunction with Nancy Adams, what was to become a well thumbed book, "Trees and Shrubs in New Zealand", was published. This has been revised in 1990.

Now in his 80's Lindsay is still very active as a forestry consultant, and is still involved in publications concerning historical aspects of this country's forests. During 1990 he helped with the documentation of the old conifers in the Wellington Botanic Garden and he is pressing for the inclusion of forestry in the training, education and interpretive activities now based in the Garden.

Alick Lindsay Poole has had a very distinguished career in Botany, Forestry, and Horticulture and the National Executive have pleasure in awarding him the Associate of Honour of the Royal New Zealand Institute of Horticulture in 1991.

## MURRAY RICHARDS

Murray Richards commenced his career in horticulture in 1936 as an apprentice with the Napier Parks Department. After a period in the Middle East in 1944, Murray returned to New Zealand and enrolled in the then Massey Agricultural College as part of the second intake of students into horticulture. Graduating in 1946 with a Diploma in Horticulture, Murray re-entered Massey, this time as a member of the teaching staff. During these early years of horticulture teaching, Murray lectured in fruit, flower, vegetable and nursery production. In 1949 Murray was awarded a National Diploma of Horticulture (NZ). In the same year he was granted leave from the College and enrolled at Nottingham University to study for a Bachelor of Science (Horticulture) degree. He graduated in 1952 and, after completing a National Diploma of Horticulture (UK), returned to Massey where he was promoted to Lecturer. Thereafter saw a sustained and productive service for 32 years to the horti-

culture industry, and in particular the nursery industry.

Murray was instrumental in establishing the NZ Nursery Research Centre at Massey University in 1974. This was a unique partnership between industry and the University and reflected the growing stature and professionalism of the nursery industry. Murray was foundation Director of the Centre and remained in this role, while continuing his teaching responsibilities to the Horticulture Department, until his retirement in 1984.

Murray was active in the NZ Nurserymen's Association, and its forerunner, the Horticulture Trades Association, presenting seminars and workshops throughout the country on a variety of aspects of nursery production and management. He served for many years on the Nursery Stock Research and Advisory Committee, which had oversight of orna-

mental research on a national basis. In 1980, Murray was awarded a life membership from the NZ Nurserymen's Association in recognition of his continuing contribution to horticulture by way of his research, teaching, and extension activities.

Murray's skills and expertise were also recognised overseas and he was often invited, as is still the case today, to Australia, Malaysia and other Pacific rim countries to present seminars and industry workshops. Throughout his travels he made enduring contacts with scientists and growers and through these, introduced many new techniques and ideas into the New Zealand industry.

Through his teaching and research efforts Murray has had a significant influence on the development of the nursery industry in New Zealand. He was heavily involved in the development of soil-less growing media for containerised plants and the value of his

research into nutrition and watering of containerised plants is still apparent in the production systems used by leading nurseries.

Throughout his 47 years service to the nursery industry, Murray Richards linked university-based teaching and research to the practical reality of commercial nursery production. His success at this is reflected in the number of his former students presently involved in research, teaching, or managing New Zealand's leading nurseries, and in the technologically advanced nature of the nursery industry. Murray Richards had made a major and enduring contribution to New Zealand's nursery industry.

The National Executive is pleased to award him an Associate of Honour of the Royal New Zealand Institute of Horticulture in 1991.

## Book Reviews

*Checklist of Phormium Cultivars* (Prepared for the Nomenclature Committee of the Royal New Zealand Institute of Horticulture [Inc.]). By Peter B. Heenan. RNZIH, Lincoln, 1991, 60pp., ISBN 0-9597756-1-7 (softback). Price: \$8.00 (GST incl.). Available from RNZIH, PO Box 12, Lincoln University, Canterbury.

None but the brave would attempt to seek order in the maze of cultivar names associated with *Phormium*. But it is a job that must be done in the interests of world horticulture, and New Zealand is the natural place to do the job. The brave in this instance is Peter Heenan of DSIR's Botany Institute, DSIR Land Resources, Lincoln.

Why bother with sorting out names? This is not the appropriate place to defend the value of a standardised nomenclature or naming system, but it can be noted that the human need to recognise and name *Phormium* variants has a long history with about 200 Maori names being assembled for the Checklist.

In his introduction the author notes three main problem areas that he encountered. First, the marketing, particularly in recent years, of selections without validly published names and with little information on their origin. Second, the diversity of leaf colour and form shown by the same cultivar under different growing conditions. Third, the variation shown by the same plant at different ages. These problems are further complicated by the extensive natural variation within the two recognised species *Phormium tenax* (harakeke, New Zealand flax), and *Phormium cookianum* (wharariki, mountain flax), the latter with two named subspecies; and by the ability of the two species to hybridise.

The Checklist comprises four lists. The first is an alphabetical list of all cultivar names located (some 380), whether or not the names are valid and legitimate. This then provides an entry to the second and third lists. The second gives names, bibliographic citations, and synonyms for all valid and legitimate names, and provides notes on distinctive features and origins. The opportunity is taken to formally validate several names widely used by horticulturists, by providing brief descriptions. In all, 219 names are accepted, with 131 of these being traditional Maori ones. It should be realised that the existence of a name does not necessarily mean that the cultivar is presently known to be in cultivation. This is particularly true of many Maori cultivars, and therein lies a task for ethnobotanists in the future. The third list gives invalid and illegitimate names with reasons for why they are placed in these categories. The fourth lists the botanical, as distinct from cultivar, names that have been published in *Phormium*.

The subtleties of cultivar nomenclature are a challenge even for specialists in the field. A few examples will illustrate some of the complexities involved. *Phormium 'Albomarginatum'*, a plant of hybrid origin had not been validly described; Heenan provides a description thus validating the name.

*P. cookianum* 'Bronze Tongue' is a new name provided by Heenan for the plant previously known as *P. cookianum* 'Nigra', a name that should not be used because Latin names published after 1 January 1959 are invalid. 'Aonga' is chosen as the earliest (1847) and thus preferred spelling for a Maori cultivar of *P. tenax*, synonyms being 'Aoanga' (Best) 'Aohanga' (Scheele & Walls), 'Aorangi' (Andersen), and 'Awanga' (Heaphy). *Phormium* 'Bobby Dazzler' is an invalid name, despite having been published in *New Zealand Gardener* in 1990, as no description was provided (i.e. it is a *nomen nudum*). On the other hand *P. tenax* 'Rongotainui' is also a *nomen nudum*, but is valid because the name was published prior to 1 January 1959. *P. tenax* 'Toitoti' is regarded as an illegitimate name by Heenan because it is the vernacular name for another plant, although of which plant is not stated. Williams' Maori Dictionary indicates it is the name of "a species of kelp" but is this sufficient to exclude it? It is clear from the Dictionary that it is not a synonym of toetoe, a name traditionally applied to many grasses and sedges, and now widely applied to native *Cortaderia* spp.

The booklet is attractively produced and easy to use, although I would strongly recommend the user first reads the Introduction to understand the layout. It would have been a help to many if a brief, formal glossary of terms such as valid, invalid, legitimate, illegitimate, *nomen nudum*, Hort., and Syn., had been provided. Nevertheless, some are defined in the introduction and the meaning of others can be gleaned by reading between the lines. I detected a few spelling mistakes and layout errors and inconsistencies, but these detract little. Of more importance is the citing of Charles Heaphy as "Major V C Heaphy". The V C is correct, but as a decoration for bravery it should be given after the surname! Also, I would disagree with Heenan's view that the vernacular English name used in New Zealand for *P. tenax* is swamp flax. In my experience the name used is New Zealand flax, and this is the name given in the floras I consulted, including "Moore and Edgar" and "Poole and Adams", and also by L. Metcalfe in his authoritative text "*The Cultivation of New Zealand Trees and Shrubs*". Additionally it is the name chosen in the widely adopted "Standard Common Names for Weeds in New Zealand" produced by the New Zealand Weed and Pest Society in an attempt to stabilise their area of plant nomenclature. Likewise I would query Heenan's suggestion that whararahi is a vernacular name for *Phormium tenax*. Indeed, his acceptance of the name *P. tenax* 'Whararahi' for a cultivar implies that it is not.

The author's task has been made easier by his having access to the compilation by Charles Heaphy (1870), the Flax Commissioners' reports to Parliament (1870, 1871), and Scheele and Wall's account (1988) of Rene Orchiston's wonderful collection of Maori cultivars. One resource that seems to have been overlooked in the preparation has been Williams' Dictionary

in its various editions. At least some of the names for which Best's "*Forest Lore of the Maori*" (1942) is listed as the first publication, are given in early editions of the Dictionary, the first edition of which was published in 1841.

Of course the author has not been able to answer all questions relating to *Phormium* names, and he seeks comment and information with a view to revising the list in the future. To start the ball rolling, I would query the inclusion of *P. tenax* 'turepo' as a valid name, as turepo is the Maori name for *Streblus (Paratrophis) banksii* and for *S. microphylla*. In a similar vein, is 'paritaniwha' a version of parataniwha, the Maori name for *Elatostema rugosum*?

This booklet is an essential text for all those involved with the breeding, selection, and marketing of *Phormium*. Hopefully it will lessen the proliferation of invalid and illegitimate names in the future. Growers of native plants, and those interested in Maori horticulture, will want to purchase it. All will be grateful for the author's efforts.

Ross E. Beever

*Wild Flowers of New Zealand* by Owen Bishop with photographs by Nic Bishop. 1990 Hodden and Stoughton. \$39.95.

Make no mistake about it, this is an excellent little book. *Wild Flowers of New Zealand* covers over 400 species of flowering plants, both naturalised and indigenous. Many of these plants are weeds to horticulturists, and so the book has two important functions — as a reference text for both wild flowers and our common weeds.

To me the most outstanding feature of the book is, in computer jargon, its "user friendliness". This text has been carefully crafted to suit the needs of the user, not just the reader or browser. The reader is supported by a series of strategies which help guide him to the ultimate objective — the name of a plant he has discovered. These systems include photographs, many of which are of excellent quality; and a text which reduces the complexities of floral classification and structure to simple basic concepts that are directly related to identifying plants. Students prepared to spend a little time studying this text will be well rewarded. They will soon absorb the necessary knowledge and skill to use the simple keys which identify the plants, and they will also pick up invaluable understanding on floral plant structure as well.

Very little previous knowledge is taken for granted. The introductory chapter explains how the book has been planned and the ways it can be used. It includes brief and succinct explanations of plant classification, family features, plant naming systems and how to use the keys. The major part of the book is split into two sections — monocotyledons and dicotyledons. The plants are grouped into families. Each family has a precis of its main floral and vegetative characteristics presented as a simple formula — easily understood after checking

out the details on the inside of the frontcover.

The species descriptions are unique for their simplicity and brevity. One advantage of the restricted range of plants covered is that the descriptions have been deliberately kept to the bare essentials.

And, should you have a personal computer there is a BASIC programme at the back of the book which you can use to identify the dicotyledons covered. I suspect that this may easily be a trap for the unwary, though. I have found with similar BASIC programmes that a lot of time can be wasted and frustration engendered when a semi colon is typed in the wrong spot. I would be more impressed with this aid if the programme was made available already on floppy disc with the book, as are other public domain programmes, sold by computer magazines.

The book has some obvious limitations of course. I wonder at the wisdom of including sections on orchids and alpine plants. These groups have been well treated in various other publications. From the horticultural point of view, we would have been better off with a few more "real weeds" in place of the celmisias, raoulias and other alpines. Strangely too, one of our most striking alpine plant groups, the wild spaniards, (*Aciphylla* spp), are very poorly treated, with just one species being described along with one of the few unsatisfactory photographs.

I would have liked to see some other widespread and/or ecologically significant weeds included. For example: sweet brier (*Rosa rubiginosa*), holly leaved senecio (*Senecio glastifolius*), German Ivy (*S. angulata*), corn marigold (*Chrysanthemum segetum*), wall lettuce (*Mycelis muralis*), bell heather (*Erica cinerea*) and heather (*Calluna vulgaris*).

The descriptions too, whilst excellent overall, omit to mention the threat that several weeds are now causing to our native bush remnants. In particular, *Tradescantia fluminensis*, *Hedychium flavescens* and *H. gardnerianum*, *Mycelis muralis* deserves a mention too, as it is the only naturalised composite to establish freely within native forest.

But, the most negative feature of the book is the presentation of the photographs. No doubt by publisher decree, these have been arranged in several groups rather than being scattered throughout the text. This in itself is a user frustration, although a relatively minor one. More significant though is their size. Up to nine colour photographs are arranged on one page measuring 160mm x 230mm. The resulting photographs measure 40mm x 55mm — and thereby run the risk of being mistaken for postage stamps. Nic Bishop must have found this particularly frustrating. It is a credit to his photographic skills that most of the resulting figures are still useful. In comparison, the recently published book on NZ ferns (by Patrick Brownsey and John Smith-Dodsworth) has pages measuring 190mm x 250mm, with six photographs per page (75mm x 60mm).

However, the final test of a book such as this is "how useful is it?" I think that it

should be on the bookshelf of every practising horticulturist. My copy is already well thumbed. I wish it had been available when I was a student!

Rob Lucas

*Cottage Gardening in New Zealand* by Christine Dann with photographs by Tony Wyber. 1990. Wellington, Allen & Unwin and Port Nicholson Press. \$49.95.

Whenever I see the words "cottage garden", I immediately have a vision of a romantic thatched cottage, a profusion of roses, hollyhocks, lavender and other herbs, an abundance of diverse flowers, fruit and vegetables, sweet scents and the hum of bees and cooing of doves. Vision? Fantasy is perhaps a better word for what I am imagining is not really a cottage garden (the garden of a villager) but the ideal of the cottage garden style. This was the style that developed as the English cottage garden was gentrified towards the end of last century and the beginning of this century, a process that Edward Hyams aptly called "Jekyllism" — "the cottage garden having an influence on the great gardens of the rich and on the medium-sized gardens of the urban middle class". Hidcote, Great Dixter and Sissinghurst can all be considered as being amongst the most proficient of this style of gardening, a style that became popularised not only because of the writings of practitioners such as Gertrude Jekyll or Vita Sackville-West but also because of a whole school of English painters. Indeed, as pointed out by Andrew Clayton-Payne and Brent Elliott in *Victorian Flower Gardens* (Weidenfeld and Nicolson, 1988), the gentrification of the English cottage garden can be followed by comparing the works of earlier artists such as Myles Birket Foster or Helen Allingham with the much more romanticised paintings of Arthur Claude Strachan or David Woodlock.

In recent years there have been many books advocating the cottage garden style and now comes one specifically written for New Zealand conditions, *Cottage Gardening in New Zealand*, which, according to the blurb on the back cover, shows "how relevant this tradition is to contemporary New Zealand". So what is the cottage garden in New Zealand? This is the question that Christine Dann addresses and if I find her book ultimately somewhat disappointing it is because I am not really convinced by the guidelines she offers "to those wanting to identify or create an authentic New Zealand cottage garden". She says that the cottage garden should be productive, practical, profuse in its plantings, ecologically sensitive; it should combine utility and beauty. Possibly, but these guidelines are sufficiently broad to include many other gardening styles and I find little to suggest that the gardens she describes belong to an authentic New Zealand tradition, especially when her book is illustrated with so many photographs of Sissinghurst. Instead, I think it better to consider this book as a good description by a New Zealander for New Zealand gardeners of a style of gardening that is undoubtedly popular and that can be most satisfying.

Ms Dann gives a brief history of cottage gardens in England and points out that the cottage gardening style developed as a reinterpretation, a conscious development of an old tradition. This is a point which I felt deserved more emphasis. There have been many histories of cottage gardens in England and I therefore found much more interesting her account of early gardening in New Zealand. Here she has some most apt quotes and some delightful photographs which deserve careful study. The reproduction of Margaret Stoddart's painting of her family's garden at Diamond Harbour is likewise most appropriate. This section of the book could well have been expanded because I believe that it is studies such as this that will allow us to better understand the development of our own gardening traditions. I kept wondering, for example, how different early gardens in this country were from those in England, or for that matter, how much colonists from the various parts of England, Scotland or Ireland differed in their gardening practices. I wondered too why men were so often responsible for the vegetables and fruit trees, women for the flowers — was this a carryover from the days of allotments or just the traditional division of labour being continued? I would also have liked more on the development of what Ms Dann disparagingly calls the "New Zealand twentieth-century stereotype" because I believe that what she dismisses as a stereotype is actually part of an authentic tradition in this country.

According to M. R. Gloag writing in 1906, "a true cottage garden can only be created by a villager ... in imitation a strange under-current of educated taste peeps out that spoils in the copy the character of the original; much of the charm of which lies in the simple combination of flowers and vegetables that only a cottager can produce." Vita Sackville-West in describing Hidcote as "a cottage garden on the most glorious scale" said that there was a "kind of haphazard luxuriance, which of course comes neither by hap or by hazard at all." Both she and Gertrude Jekyll emphasised that for the romantic profusion wanted in the cottage garden style great skill was required in both planting and design. Ms Dann in turn reiterates the importance of design and careful garden planning. Her chapters on "Contemporary cottage gardening", "Designing your cottage garden" and "The practice", although somewhat repetitive, contain much commonsense and good advice useful to almost all gardeners. Very sensibly, she points out that the climate of most of New Zealand is very different to that of the cold European countries from which most traditional cottage plants originated. Many of these plants are therefore quite unsuited to our climatic conditions, particularly those of the north of New Zealand. Ms Dann provides a most useful list of plants appropriate for our warmer gardens and suggests alternative approaches — for example, why not replace snowdrops and bluebells with *Agapanthus*? I do, however, take exception to some of her comments. To compare the use of inorganic fertilisers with the use of steroids by athletes or with takeaway foods is, in my view,



just plain silly (which is not to deny the importance of composting or soil quality.). Inorganic fertilisers properly used have their place. Nor do I accept a "good cottage gardener is a good organic gardener" or that "spraying with toxic chemicals is for ignorant gardeners". Sprays likewise have their place and I would prefer a more balanced view of the danger of garden chemicals. After all, many household products are of equal or greater toxicity. The important thing is to use sprays under the appropriate conditions and with the necessary precautions.

In the traditional English cottage garden the cultivation of vegetables and fruit trees was often out of economic necessity, even if writers and artists considered that it was the mixture of flowers and vegetables that provided so much of the charm. Most current books on cottage gardening give fruit and vegetables little attention but Ms Dann considers both utility and beauty with useful information on vegetables. The bulk of the book is, however, devoted to flowers and foliage plants, almost entirely perennials with bulbs and annuals getting mainly brief mention. There are lists of "Traditional English cottage plants", "Cottage newcomers", "New Zealand cottage plants" and "Cottage roses" with concise details as to plant type, growth habit and requirements and flower colour. I do have doubts as to the correct placement of some plants — for example, accepting the dates of introduction as given in the RHS *Dictionary of Gardening*, can *Cynoglossum nervosum*

(introduced 1894), *Iris chrysographes* (1911), *Lilium regale* (1903), *Meconopsis regia* (1931), or *Thalictrum dipterocarpum* (1908) really be considered as traditional cottage garden plants? Furthermore, *Geranium maderense*, also so listed, is generally considered as too tender for most parts of Britain and is certainly not a traditional plant. Most gardeners will also think of additional "cottage newcomers". To me, *Eomecon chionanthum*, *Thunbergia natalensis* and some of the *Plectranthus* species are obvious candidates. These comments, however, are comparatively minor quibbles.

Much more serious is the problem of correct botanical nomenclature. The botanical nomenclature of garden plants is subject to frequent revision and is often more difficult, indeed, often much more difficult to establish than that of wild plants. In her preface, Ms Dann discusses the need to refer to plants by botanical names as well as by popular names, and in a book such as this with long lists of plants, correct nomenclature is very important. Unfortunately, there is an unacceptably large number of errors in generic, specific and cultivar names. In this respect, the index is particularly bad. There is also confusion from the outset between varieties and cultivars and too often cultivar names are given as if they were of varieties. These problems could easily have been avoided by checking with a few standard authorities, as should certainly be done if a new edition is contemplated.

*Cottage Gardening in New Zealand* is

well illustrated and Tony Wyber receives generous acknowledgement for having provided the original idea for the book. The photographs of Sissinghurst are particularly attractive even if I do wonder about their relevance. The detailed photographs are generally good and most serve well their purpose of allowing the identification of nearly 400 plants. It should be noted that many of the plants photographed are not discussed in the text or included in the lists of cottage plants.

There is a useful bibliography providing further reading and a most valuable list of nurseries and seed suppliers.

My comments make it obvious that I cannot wholeheartedly recommend *Cottage Gardening in New Zealand*. Let me therefore conclude by saying how pleased I was to get a book published in New Zealand and written for gardeners in New Zealand. Usually, all that is available are books written and published overseas: what we read is often not suitable for our climatic conditions or, even, appropriate to our landscapes. Accordingly, I hope that many other New Zealand gardening books will follow. Furthermore, although I didn't always agree with the author, she cannot simply be ignored. She writes well and there is no doubting her enthusiasm and her commitment. Most gardeners will gain from this book.

A. R. Ferguson

# Role of Soft-wooded Shrubs in Auckland Gardens

K. J. Veal

9 Gray Crescent, Torbay, Auckland

A range of soft-wooded shrubs give colourful displays in Auckland gardens from late summer to mid winter. Some are lesser known than others. These plants are important for adding a touch of brightness when deciduous trees and shrubs in the garden are losing their foliage. Many come from similar habitats overseas and undoubtedly the mild Northern climate allows them to flourish and provide variation at this time of the year. The following observations are of a typical range of such plants growing in the author's Torbay garden. The site is on Auckland's North Shore, some 200m from the sea with a north easterly aspect. The soil is a sandy loam overlying a clay base, and tends to extremes of wetness and dryness so that successful plants need to be tolerant of these conditions.

*Plectranthus* (spur flower) when not flowering would not merit a second glance. Leaves are mainly of a drab green colour — some shiny, some matted, some with a coloured reverse, although *P. argentatus* with its silvery colour is an exception. Most have marginal indentations, and are of variable sizes and shapes. Height is rarely over 150cm, with several species being prostrate. In such a large family ranging from the Pacific via Australia and Asia to Africa, correct identification of *Plectranthus* grown in New Zealand can be difficult. In the garden most thrive as under-canopy plants in the shadow of small trees.

*P. ecklonii* has been available for many years in Auckland. When given something to lean on, the plant becomes a pseudo creeper sending long leaders up into adjoining trees and shrubs. Mid autumn flowering produces a liberal supply of dark purple spires, many of them reaching high on their support plant. Clipped, *P. ecklonii* makes a good informal hedge for garden plot division. Versions in pink and white do not appear to be available locally. *P. argentatus*, with medium tapering silver leaves, brownish pink stems, and spikes of spaced mauve flowers, is from Queensland. An attractive plant, 80cm in height, with several stems rising from a woody rootstock, it can be placed to contrast with and lighten dull neighbouring foliage. Annual replacement seems necessary, as it exhausts itself within one growing season. On other sites, however, this might not be necessary. Autumn cuttings normally root within a month, and a handsome replacement is quickly available.

Three or four years ago *P. fruticosus* was introduced to the Auckland Regional Botanical Gardens. Plants raised from seed obtained from Kirstenbosch have shown this plant to be indeed worthy. With medium-sized heart-shaped leaves, reddish on the underside, on wine-brown stems, the autumn flowering is in harmony with the whole plant. The result is a rosy pink mass of minute flowers which lasts for a month or so.

A dramatic plant which has been around Auckland for a number of years unnamed

has been identified as *P. grandis*. It is comparatively large, with large leaves and flower heads. Unlike the other *Plectranthus* mentioned, this is broad based and quickly fills large gaps in the garden. In winter, 25cm spikes of strong, firm dark purple flowers emerge. It is one of the larger members of the genus.

*Pychnostachyus urticifolia* could be the answer for a true blue flower. Its specific name refers only to the nettle shaped leaves; the stinging quality of nettles is definitely absent. Mid green leaves set off whorls of cornflower blue flowers. The line-green colouring of unopened flower buds complements the flowers and the whole head appears to be wearing a delicately curved and pointed cap on top of a blue base. Growth is open with flowers arising from leaf axils, and as terminal spikes. From the appearance of its seedpods, *Pychnostachyus* has acquired the name of hedgehog plant.

*Leonotis leonurus*'s club-like flowering heads (lion's ear) develop on a multitude of cane-like stems. In ideal conditions these whippy growths, with small dark green rather harsh leaves, can reach 275cm but normally are much shorter. Startling orange is the usual shade of the multi-rowed whorls of velvety erect flowers — a hard colour to place in some gardens. If so, paler shades of orange or creamy white forms can be found, as seedlings produce a range of colours. Leaves smoked as dagga are harmless; they have no narcotic properties. As with many flowers of this colour, *Leonotis* brightens up a dull grey sky.

*Tetradenia riparia* (previously *Moschata* (*Iboza*) *riparia*) is the Mountain Mist of Transvaal. This brittle, semi-succulent, loose-limbed shrub, with long lax growths, happily threads its way through surrounding trees towards the light. There, masses of mauvy pink flowers develop as large terminal and axillary spikes. Male and female flowers are produced on different plants, the male inflorescence being more graceful and less compact than the female. Minute flowers 2-3mm in diameter create the so-called 'mist'. Main stems become quite heavy and unless some support in the way of neighbouring shubbery is offered, plants can fall over and cause damage to surrounding vegetation. It is at its best at the back of a border. The plants so far mentioned are all included in *Lamiaceae* with aromatic leaves and squarish stems.

*Podalyria sericea* is a tough little shrub not seen about these days as much as it should be. With its silky silvered leaves and pink pea flowers it is a good plant to add a grey note to a garden. Rarely over 100cm in height and of similar width, it thrives in hard conditions and grows happily on a clay underbase tolerating winter wetness and summer dryness. Clipping after flowering maintains shape. The plant is easily replaced by seed. *Podalyria* belongs to the *Fabiaceae* family.

*Acanthaceae* leads to immediate thought

of ancient Greek and Roman temples and carved decorations inspired by the leaves of *Acanthus mollis*. To look at *Barleria obtusa* in the same family is to wonder where the relationship lies. The leaves could not be more different from those of *A. mollis*. They are simple ellipses to 6cm long, soft and velvety to touch. Flowers are not carried on heavy spikes; instead they are borne in cymes on short pedicels in the leaf axils. This is a neat 50cm tall plant with angled stems and abundant bright, purple-blue flowers. Another member of the *Acanthaceae*, *Hypoestes aristata* has similarly shaped but more distinctly veined leaves of a darker green carried on cane-like stems. Small floral whorls arise in the upper leaf axils of the 150cm plant. The flowers are curious. Double lipped and tubular, of a vibrant mauve, the upper corolla lobe turns back to give the impression of a curled ribbon. Close examination shows that this lip has a triangular central area minutely dotted with specks of the same colour on a white ground. As a vase flower it has a long life. Successful work has been done in South Africa in miniaturising *H. aristata* for use as a container plant.

Its close relation, the smaller growing *H. phyllostachys* (the polka dot plant), is usually regarded solely as an indoor plant, but has proved a hardy and ornamental addition to the outdoor scene. Tiny magenta flowers appear in the leaf axils to add to the overall colour. Pink spotted plants are far from the norm in a garden.

A garden would not be complete without a few members of the daisy family. *Euryops pectinatus* has gained popularity in recent years. Its handsome, heavily indented greyish foliage is ornamental at all seasons. In autumn, crops of large brilliant yellow, wiry stemmed daisies appear. They are excellent as posy flowers. Prior to the introduction of *E. pectinatus*, *E. tenuissimus* (Paris daisy), with its fine needlelike foliage, was commonly grown. However, unless carefully groomed it quickly becomes straggly. *E. pectinatus* is far more tolerant of neglect.

*Chrysanthemoides monilifera* is closely related and similar to *E. pectinatus* in both flower and foliage, but with bright shiny green leaves. It flowers at the same time. It is used extensively as a freeway planting in South Africa. *Erlangea rogersii*, a plant introduced by R. E. Harrison more than forty years ago, is still far from common. Small clusters of mauve, ageratum-like flowers top this softly downy plant. Stems take on a reddish tinge, and selective planting can relieve an area over endowed with green. From South Africa, and daintier than *Ageratum*, it is a good posy flower.

All in all a selection of soft-wooded shrubs such as these add much to a garden. From the author's experience they are of proven tolerance to different soil conditions, as they are also to degrees of moisture deficits and excesses. Additionally they appear to require little nutrient supplement. Although

these tolerances exist, all plants benefit from some attention to these aspects. Insect damage is also negligible, and disease tolerance is high.

As far as shape is concerned, these plants tend to sprawl, a habit which some may say is untidy. However staking and tying to

achieve better orderliness can remove part of their inherent charm. Normally longevity is not a feature but, when age brings unsightliness, ready replacement is possible from seed, semi-hardwood cuttings, or rooted off-shoots.

There is no doubt this type of soft-wood

shrub, of which the above are but a few examples, can be an extremely valuable complement in northern gardens during late autumn and winter.

## Plant Raisers Award 1991

Mr Neville Haydon, an Auckland nurseryman who specialises in camellias, received the 1991 Plant Raisers Award of the Institute at the 1991 Conference. Mr Haydon has gained an enviable reputation for his expertise, the quality of the plants he sells and for his personal integrity. His outstanding service to the New Zealand Camellia Society and to the genus *Camellia* has been recognised by his election as Honorary Life Member of that Society. He has also been a most generous supporter of the research activities of the Camellia Trust.

Mr Haydon is a skilled plantsman with high standards and a very critical eye. Each of the four plants he has registered with the Camellia Society of New Zealand is outstanding. They demonstrate his interest in developing plants whose smaller scale and restricted growth make them most suitable for suburban gardens of limited size. The dwarf plants, 'Baby Bear' and 'Baby Willow' are particularly important as they are probably the only true dwarf camellias registered in New Zealand and may well be the only true dwarfs registered anywhere in the world. All four plants nominated are good garden plants.

### Baby Bear

(No. 127 *Camellia* hybrid)

A seedling of *C. rosaeflora*, the male parent being *C. tsaii*, raised by Mr Neville Haydon, of Howick, Auckland. The plant is notable for its extremely dense, dwarf habit

which makes it highly suitable for bonzai or rockery use. Propagations by grafting and cuttings exhibit the same dwarf habit. The leaves are dark green, 4 cm x 2 cm; the flowers single with six petals, gold anthers and measure 2 cm x 2 cm. The colour shades from light pink to white.

*New Zealand Camellia Bulletin* 9(6):27 (1976)

### Sun Song

(No. 141 *Camellia* hybrid)

A chance seedling of *C. X 'Elegant Beauty'*, which first bloomed in 1976 and was raised by Mr Neville Haydon of Howick, New Zealand. The plant has average growth habit and density; the foliage is dark green, leaves measuring 11 cm x 6 cm; the flowering season is early to late. The blooms are formal double with 80-82 petals and petaloids, the centre rows of which are small, strap shaped and measure less than 1cm, giving the flower a distinctive appearance. There are no stamens or pistil. The colour is soft pink (RHS Group 52 c-d, on reverse deeper pink, RHS 52 a-b). The flower size is 11 cm x 4 cm. Said to give good lasting quality, and is self-grooming.

*New Zealand Camellia Bulletin* 11(3):20 (1979)

### Baby Willow

(No. 195 *Camellia* hybrid)

A seedling raised by Mr Neville Haydon of Camellia Haven, Papakura, New Zealand,

from a cross *C. rosaeflora x C. tsaii* hybrid ('Mother Bear'). It first flowered in 1981 and is dwarf with a weeping habit of growth. Growth is medium. The leaves 6 cm x 2 cm mid green are wavy like *C. tsaii*. The single miniature flower is white with yellow anthers, 1.5 cm in diameter and 1 cm in depth with six petals. Flowering is mid season. This seedling is offered for registration because of its unique plant form which resembles a miniature tree with weeping branches.

*New Zealand Camellia Bulletin* 13(2):12 (1983)

### Takanini

(No. 260 *C. japonica*)

Neville Haydon of Auckland gives us a seedling of *C. japonica* 'Mark Alan' with this registration. Eight years old, it first flowered in 1984 in Auckland. Upright in habit and a quick grower it has dark green leaves with average dimensions of 9 cm in length and 4 cm in width. The flowers are small to medium of a deep plum red colour measuring 8-9 cm in diameter and 3.5 cm in depth. There are 15 petals and 140-200 petaloids with an occasional anther amongst them. An extremely long flowering season from early to late and a bright sheen on the flower is characteristic. RHS Colour Chart 46A.

*New Zealand Camellia Bulletin* 16(1):26 (1989)

# Thomas Mason (1818-1903) The Finest Garden in the Southern Hemisphere “The Gums”, Taita, Wellington

Winsome Shepherd, A.H.R.I.H.  
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*Last century Thomas Mason created a wonderful garden at Taita in the Hutt Valley. Unfortunately it was not preserved. The land was ultimately subdivided for housing, and with it the Hutt Valley lost the opportunity to obtain a ready made botanic garden. Fortunately some of its horticultural wealth is still evident but before discussing this, its development is traced from its beginning. Only primary sources have been used as the basis for this article.*

A young Yorkshire Quaker couple, Thomas and Jane Mason arrived at Port Nicholson per the ‘Olympus’, 21 April 1841. Thomas was only 23 when the couple settled on land at Taita, in the Hutt Valley about three miles above the entrance of the Hutt River at Petone. Running alongside the river most of the land was covered with thick, heavy totara. Many of the trees were huge, at least over two hundred years or more in age, some 100 to 150 ft high and 3 to 8 ft in diameter. Here Thomas and Jane built their house, raised a family and in time created what many considered the finest garden in the southern hemisphere. (Fig.1.)

Their first house was a small wattle and daub whare. The second house, started in 1853 after Mason’s return from Tasmania, was of a more permanent nature. There was some delay however as their carpenter, in the middle of building it, decamped for the gold diggings. Like all houses in the valley this second house was built upon posts 1-1½ ft above the ground on account of floods which came when the river rose over its banks. A sketch, (not shown), drawn by Frederick Mackie in 1853, shows bush still standing and the house the usual lean-to to which Mason probably continued to add as shown in two illustrations (Figs. 2&3).

Quaker Journals of Frederick Mackie on his tour of the Australasian Colonies 1852-1855<sup>1</sup> and travels of Robt. and Sarah Lindsey<sup>2</sup> provide valuable illustrated information. Mackie spent some time with the Masons. As well as the sketch of the house another shows the Maori whares on the property. (Fig.4.)

Mason was one of three settlers in a district somewhat distant from Wellington and from which all requirements had to be fetched. William Jones in “Quaker Campaigns in Peace and War” said:

“The goods were brought in a row boat up the bay from town to the mouth of the river, and thence were carried on men’s backs through miles of rough bush track. Starting from home at 2am and finding their way through the forest by lighted torches of totara pine, the return journey from Wellington was not usually accomplished until 9 or 10pm long after darkness had set in. Mrs Mason’s piercing “cooey”, and her



Fig 1. Thomas Mason (1903). Alexander Turnbull Library.



Jane Mason. Lower Hutt Public Library.

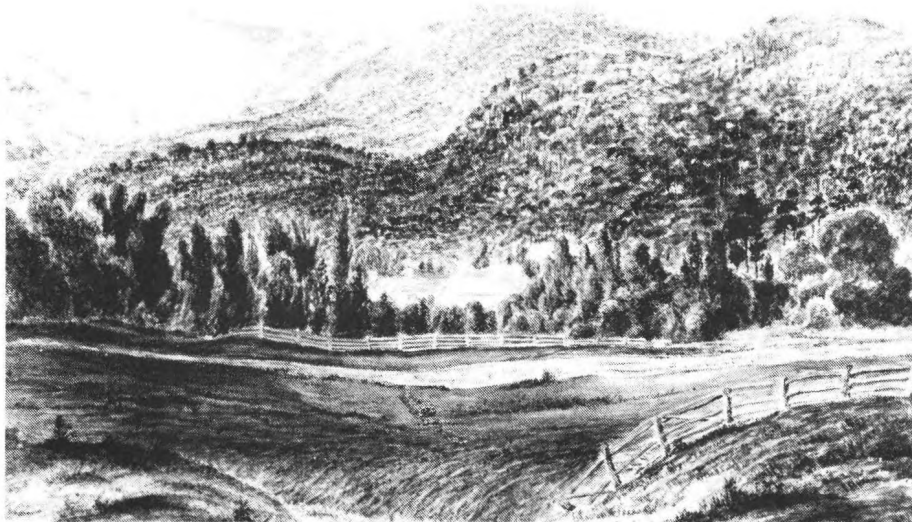


Fig 2. Mason’s Garden, Hutt Valley c1870. Photograph John Atherton Chorsfall. Alexander Turnbull Library.

husband’s equally vigorous response could be distinctly heard re-echoing through the sombre silent forest for fully an hour and a half before he gained the river bank opposite the whare where the canoe stood ready to ferry the goods and himself across the river”.<sup>3</sup>

Mason was deeply religious so it was here that the family established the first regular Meetings for Quaker worship in the district. More often there was just the family, but on occasions Friends from Wellington joined them.

In 1853 Frederick Mackie said:  
“The little Meeting, buried as we are in the wilderness, was a season of refreshment and comfort.”<sup>4</sup>

There was by now, according to Mackie, “an excellent road along the margin of the bay with 2 horse vans running daily. It was a romantic drive” and he describes flax, karaka, toetoe, and native fuchsia as plants prevalent in the area.

Again quoting from Mackie: “This morning I joined Thos. Mason in the wheat field, reaping. His Maori labourers soon discovered that I had never handled a sickle before. The wheat, owing to the wet summer is a good deal blighted.”<sup>5</sup>

For all newcomers arriving in the colony, survival was paramount. At Taita, the thick, impenetrable bush had to be cleared so cattle could graze and crops sown. It was well into the 1850s before Thomas Mason



Fig 3. Thomas Mason's Hutt Valley homestead c1900. Photograph S. R. M. Jenkin's Collection. Alexander Turnbull Library.

had the leisure to develop his love of plants.

Survival occupied Mason's mind when writing to his father just six weeks after their arrival, but he (or at the instigation of his wife) did not ignore the flower garden. Potatoes and vegetables again dominate the second letter but mention of oak and ash trees hints at this Englishman's wish to brighten up the sombre native landscape. 8 June 1841<sup>6</sup>

"Please send me some seeds of asparagus, Siberian crab, onion, red cabbage, and other seeds of good vegetables with a few hardy flower seeds as . . . dianthus, and a few rose tree seeds and some hawthorn."

10 August 1841 he wrote again:

"Have put in a few seeds and some potatoes. I have got as many sorts of native potatoes as I could and intend trying which is best. I have sown some seeds but roots are better if anyone is coming please send me a few and any other good varieties as you may happen to have. 2-3 potatoes of a sort is sufficient. I should like also if you have the opportunity of sending them — some acorns, ash seed and Siberian crab. Also a few of the best varieties of onion and if possible to be got some broom corn — a sort of maize".

The English potatoes were harvested in 1842, yielding well, whilst strawberry and raspberry plants raised from seed were ready to plant out.

The soil was a rich alluvial deposit of sandy loam 8 to 11 ft deep and resting on gravel, affording good drainage to the ample rainfall. Violent gales swept the valley from the north-west and south-east. Mason continued to bring land into cultivation until the outbreak of disturbances with the Maori. As a Quaker he was unable to take up arms and somewhere around 1846 he took his family to Hobart where he founded the "Friends School". Families of other settlers in the area also moved away or into Wellington so for a few years little progress was made in the Hutt Valley. According to naturalist William Swainson many properties appeared abandoned. In a letter to his son Geoffrey, Swainson wrote 28 July 1847:

"I had a long letter from Mr Mason the other day who is still in Hobart Town without any intention at present of returning to the Hutt. In him we lost the most valuable settler of the district, plain indeed in his

manners but kind and considering in his disposition with great experience and great prudence, above all with a thoroughly Christian temper in every social intercourse and domestic relation."<sup>7</sup>

Some time in 1850 Mason did return and time proved that Swainson's assessment was right — Thomas Mason was indeed a valuable settler.

From Hobart Town Mason brought back eucalyptus seeds and a variety of apple trees. The latter formed the nucleus of his orchard. In the following year, 1851, a



Fig 4. Maori huts, T. Mason's property Feb 1853. Sketch from F. Mackie: Traveller under Concern. 1973.



Fig 5. Mason's Garden Summer House. Lower Hutt Public Library.

further 150 fruit trees of various kinds and varieties were added — apples, pears, peaches, plums, cherries, apricots, Siberian crab, walnut, Spanish chestnut, almond (of some only one of each) together with a supply of small fruits, rhubarb, etc. Gooseberry plants were obtained from Ludlam at Woburn, and grape vines imported from Sydney. It is uncertain as to whether the fruit trees came from Hobart or Sydney. The same letter describing the above also refers to a 'macadamised road passing through the land, a stone's throw away from the house.'

The eucalyptus seed germinated and were planted around the property from which it subsequently took its name. In 1893, J. H. Veitch, the English nurseryman after visiting Mason's garden, commented that both the Tasmanian Blue Gum (*Eucalyptus globulatus*) and the Western Australian Jarrah (*E. marginata*) assumed the proportions of forest trees. Also by this time an inner sheltering boundary of coniferous trees had been established.

It is not surprising that by 1867 Mason was harvesting 10 tons of good keeping apples. From one Stonepippin, he took 8cwt of fruit. It is said that Mason supplied the whole of Wellington with rhubarb, tomatoes, and apples, drays leaving at regular intervals several days a week. Manure came from his horses, sheep and pigs imported from Sydney. In the beginning young plants were often damaged by rats or wild pigs whilst severe frosts (Aug.1875) and bad storms took their toll as they do in any garden.

The area under cultivation covered about 12 acres — orchard, lawns, kitchen garden, flowers and shrubs. Letters of 1860 make the first reference to the importation of plants and seeds from the English firm Backhouse and Son. In 1871 Mason enquires from his father as to whether catalogues are available from this firm or that of Edwards. In the same letter he says:

"I have upwards of 100 fine kinds of roses and 60 camellias besides azaleas and rhododendrons, all of which flourish here. Some camellias are upwards of 7 feet and have been in bloom for 5 months. The garden is my recreation."<sup>8</sup>

In 1870, Thomas Lang, Nurseryman, Elizabeth St. Melbourne is noted as supplying Mason with plants. Veitch of Exeter and London was later known to have supplied plants and seeds.

Known familiarly as Quaker Mason, and now 52 years old, Thomas concentrated on building up his collection of plants. For the next 30 years he indulged in "his recreation". Every year he imported more plants — there were hundreds of named roses, bulbs, hydrangeas, treasures from America such as the tulip tree *Liriodendron tulipifera* (45 ft in 1896), the cork oak, *Quercus suber* (35 ft in 1896), 30 varieties of the Chinese tree peony, *Poenia moulon*, bamboo, plantains, lilies, ericas, perennials and annuals. There were at least 60 varieties of *Camellia japonica* and 46 varieties of rhododendrons. His letters of 1885 mention four more, viz. "*Rhododendron Grand*, Arab, John Waterer, and Princess Mary of Cambridge." The 'Gums' became known as the largest garden in the southern hemisphere. Eight gardeners were employed on a regular basis and in busy times there were over 15. There were reputed to be 8 miles of box hedging, fascinating summer houses to sit in and relax and the paths wide enough for Mrs Mason who suffered ill health to accompany her husband in a little dogcart. (Fig.5)

In November 1896, before the Wellington Philosophical Society, Mason read a paper "An account of the plants growing at 'The Gums', Taita", 1500 species in all. Climate and some spring growth rates are recorded. The list is alphabetical so that climbers, annuals, trees, etc. are not differentiated.<sup>9</sup> A supplementary list was published in 1903, the year Mason died.<sup>10</sup> The list is an incredible collection, confirming Thomas Mason as a remarkable horticulturist. Included in the list are 25 species of *Magnolia*, 29 species of *Pinus*, 17 species of *Quercus*, 16 species of *Cupressus*, 25 species of *Iris* and 41 species of *Erica*.

Many famous people came to 'The Gums' including Professor Wilson from Harvard University and as already mentioned J. H. Veitch of the Royal Exotic Nursery. The latter in an article entitled "Traveller's Notes" refers to the large collection of *Abies*, *Cupressus*, and other genera. Many individual species are mentioned by name. Veitch concludes:

"The wide range and varied conditions under which the above named plants are found in nature, clearly point to there being many less favoured spots for the formation of a general garden than Wellington, New Zealand. Likewise it is not a question of the mere existence of so many species, for almost without exception all are in excellent condition, since Mr Mason does away with those that do not please the eye by any defect in vigour and health, claiming to be purely and simply a gardener, seeking no gratification from the mere possession of species."

Veitch makes some interesting comments on other gardens including an unfavourable one for the Botanic Garden.

"Mr Macnab owns the late Mr Ludlam's famous garden, now somewhat neglected. In addition to this Sir James Hector has six

gullies on his private estate, clothed with hundreds of tree ferns and native vegetation generally, in which pheasants and quail make their home; and mention should be made of the public garden, although it is of little interest."<sup>11</sup>

"The Gums" were probably at the height of their glory when Mason died in 1903. The property passed to his eldest daughter and through her to her son, Thomas Wilford (later Sir Thomas). Wilford tried desperately to keep the property going but the upkeep was tremendous. Government was asked to preserve the property as a National Trust — after all it was the finest garden, public or private in the southern hemisphere. Lack of funds made this impossible. Wilford then tried to get the Hutt Borough Council to take them over as public grounds. Mason had been a Hutt Councillor and served as its Chairman but here also financial constraints prevented this.

Increasing costs finally forced Wilford to sell to Messrs Keene and Reid. These two men appreciated the value of the property. Most of the farm was sold but they retained the house and garden, opening them to the public, charging admission and supplying refreshment. It was the age of the 'Tea Gardens'.

Although many Wellingtonians did visit Mason's Tea Garden they were too far out from Hutt and Wellington towns to attract sufficient numbers of people to pay the upkeep on the property which still required 6 fulltime gardeners to maintain lawns, cut hedges, and attend to flower beds, glasshouses and orchard. Managers were appointed and at one time under a Mr Chivers, a small plant catalogue was issued.<sup>12</sup> (Figs.6,7.)

The property changed hands several times until purchased by a land agent, Mr James Stellin. Stellin too, tried to carry on,



Fig 6. Thomas Mason garden, Taita. Lower Hutt Public Library.

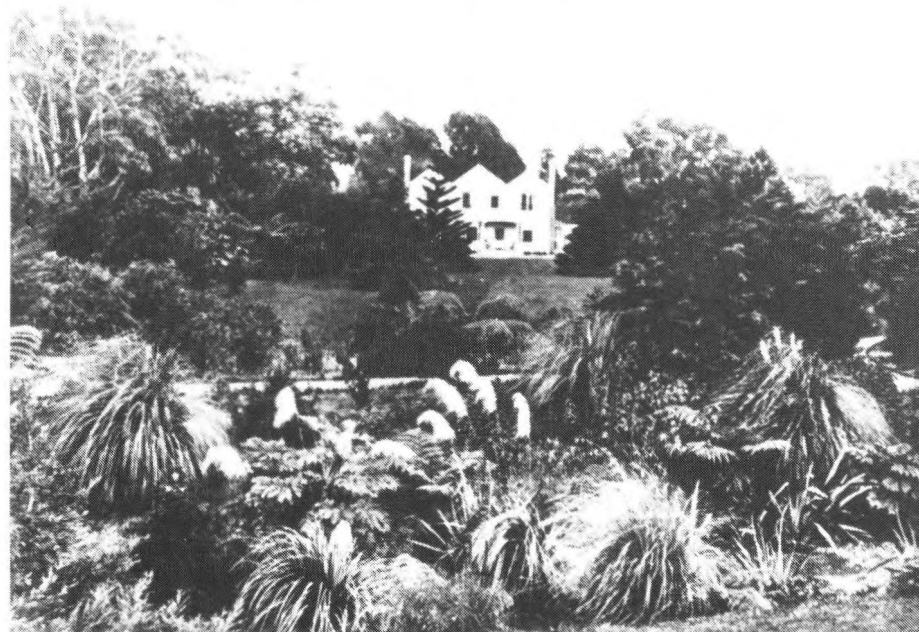


Fig 7. Thomas Mason garden and homestead, Taita. Lower Hutt Public Library.

but was defeated and surveyed the property for building sites taking care to preserve as many features as possible. (Fig.8)

The Nation was offered the land at £17,000. To an outside buyer it was £20,000. Parliament discussed the matter, Professor Wilson wrote from Harvard, the Mayor of Lower Hutt convened meetings and many schemes were discussed but to no avail and 22nd May 1922 saw the end of this unique garden when the Avalon Estate was auctioned. The auctioneer's brochure is beautifully illustrated, conveying some idea of the garden's layout.<sup>13</sup> Surrounding boundary trees were felled and burnt. Panoramas taken from the western hills show the smoke that filled the valley for weeks. Many beautiful New Zealand gardens, including Alfred Ludlam's also at the Hutt, have received a similar fate but this is certainly one of the most tragic. (Figs. 9,10)

It is perhaps fortunate that some treasures still remain and there is certainly a feeling of the past surrounding the homes. Pressures have caused further subdivision and many important trees may yet be lost as this continues. Fortunately, as has been demonstrated on occasion, most of the home owners, sensitive to the rich past that they enjoy, maintain a certain vigilance when dangerous occasions arise.

In October 1990 members of the Wellington District Council were shown the following trees by David Aitcheson, the arboriculturist for the Lower Hutt City Council. David is responsible for looking after the trees, some of which are registered with the R.N.Z.I.H.

Registered trees.

- 2 Avalon Cres. *Quercus suber* Cork oak. 25' in 1896. 55.77' in 1989.
- 7 Avalon Cres. *Sophora japonica* pendula. Weeping pagoda tree. Only old specimen known in N.Z. 13.12' high. 1989.
- Fraxinus excelsior* pendula. Weeping ash. 32.8' in 1989
- 7A Avalon Cres. *Magnolia campbelli*. 45.93' in 1989.
- 9 Avalon Cres. *Castanopsis cuspidata*. Gold leaf chestnut. 49.2' in 1989.

Not Registered:

- 4 Avalon Cres. *Liriodendron tulipifera*. 45' in 1896. 60' high, 10' circ 1990.
- 6 Avalon Cres. *Sequoiadendron giganteum* Wellingtonia Big Tree. 65' in 1990.
- Podocarpus totara*. Totara.
- 9 Avalon Cres. *Castanopsis cuspidata*. Gold leaf chestnut. *Liriodendron tulipifera*.
- 12A Avalon Cres. *Quercus suber*. Cork oak.
- 18A Avalon Cres. *Ginkgo biloba*. 30' in 1990
- 22 Avalon Cres. *Quercus robur*, *Quercus canariensis*. Spanish oak. (Figs. 11,12.)

The entire area should carry a covenant of "Historic Horticultural Significance" as has been done, although in different words, by the Wellington City Council for some of the Donald estate in Karori. By this means the traces of box hedging, camellias, hollies, ginkgo, cantuas, bananas and many other legacies of the past might be preserved. One remaining gazebo moved recently by the owner could perhaps be resited to a more appropriate place and restored. Above all a survey of all the remaining plants in the area is called for, surely a worthwhile pro-



Fig 8. Subdivision plan of Thomas Mason estate 1922. Lower Hutt Public Library.

ject for some student. It is possible that a few of the old paths are still visible.

What was Mason's contribution to early Wellington? He was a gentle, reserved, deeply religious man, but he could be firm if occasion demanded. He was extremely generous, giving struggling families fruit and vegetables until they could grow their own, donating plants to the Wellington Botanic Garden, giving seeds and cuttings generously. He would send wagon loads of flowers into the city or to the Hutt town for any special event. He served the Hutt Council, he was M.P. for the Hutt for 20 years. When Alfred Ludlam died in 1875 Mason replaced him as a nominated member of the Board of Governors of the New Zealand Institute. He was Chairman of the Board when he died in 1903. As a Governor of the New Zealand Institute Board, he was therefore a member of the Botanic Garden Board and was its Chairman in 1891 when the Botanic Garden passed to the Wellington City Council. It is not surprising that planting efforts carried out by Mason and Ludlam in their gardens — *Quercus suber*, *Liriodendron tulipifera*, *Abies pindrow*, *Abies pinsapo*, to mention a few — are reflected in some of the historic trees found in the Wellington Botanic Garden.

Curiously, and possibly due to the lack of primary source material on Ludlam, it has not been possible to find in what esteem these two men, two of the country's leading horticulturists, held each other.



Fig 9. Thomas Mason garden, Taita. A glimpse into the garden showing the box hedging. Lower Hutt Public Library.



Fig 10. Thomas Mason garden, Taita. The path winds through some of the bush. Lower Hutt Public Library.

### Sources

- <sup>1</sup>Mackie, F. 1973. Traveller under concern, Hobart Univ. Original sketches held in the Rex Nankerville collection, Canberra.
- <sup>2</sup>Lindsey, R. 1886. Travels of Robt. & Sarah Lindsey. Lond.
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- <sup>4</sup>Mackie, F. 1973. Traveller under concern Hobart Univ.
- <sup>5</sup>Ibid.
- <sup>6</sup>Letters Thos. Mason to his father. Alexander Turnbull Library.
- <sup>7</sup>Letters Wm. Swainson to Geoffrey Swainson. G. Swainson, Palmerston North.
- <sup>8</sup>Letters Thos. Mason to his father. Alexander Turnbull Library.
- <sup>9</sup>Mason, T. 1897. An account of the plants growing at the 'Gums', Taita. Transactions and proceedings of the New Zealand Institute 24:393-412.
- <sup>10</sup>... 1903. A list of plants growing at the "Gums", Taita. Ibid 35:374-377.
- <sup>11</sup>Veitch, J. A. "A Travellers Notes 1891-1893" lent A Mason, Feilding.
- <sup>12</sup>Mason's Gardens Catalogue "Ornamental & Flowering Trees, Shrubs & Roses". Lower Hutt Public Library.
- <sup>13</sup>Avalon Park Est. J. Stellan.



Fig 11. No 7 Avalon Cres. Oct 1990. Wellington District Council, RNZIH being addressed by Rob Smith. A registered weeping ash is on the right. Photograph R. Lucas.



Fig 12. No 7 Avalon Cres, Oct 1990. A registered weeping pagoda tree.

Photograph R. Lucas.



