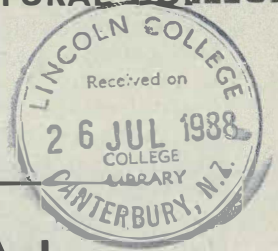
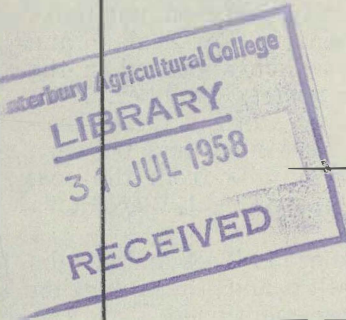


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UNIVERSITY OF NEW ZEALAND

WIND SHELTER AND WIND TOLERANCE

J. H. Glazebrook, Senior Lecturer in Horticulture.

There are few parts of New Zealand which are not subjected to winds from one quarter or another at some time of the year and gardeners are constantly seeking trees and shrubs which will tolerate windy, exposed positions. This problem is, of course, not peculiar to New Zealand and an article by Mr W. Arnold-Foster which appeared in the Journal of the Royal Horticultural Society, October, 1951, gives an excellent account of experiences in the West Cornwall area of England—"on the treeless moorland between St. Ives and Land's End . . . half a mile from the sea, over 600 feet above sea-level, so exposed that Blackthorn only reaches a height of two feet".

Mr Arnold-Foster describes numerous trees and shrubs which have survived in this locality and the following species have been selected from those mentioned.

Three trees are listed as of outstanding value—*Pinus radiata*, *Quercus ilex* and *Olearia traversii*. As examples of outstanding shrubs Mr Arnold-Foster names *Senecio rotundifolius*, *S. elaeagnifolius*, and *S. monroi*, *Olearia albida*, *O. macrodonta major*, *Escallonia* spp., *Euonymus japonicus*, *Pittosporum* spp., and *Griselinia littoralis*. Most of these plants will be well-known to New Zealand gardeners, not only because of their extensive use in this country, but also because of the fact that most are in fact New Zealand native plants.

The long list of wind-tolerant shrubs also contains many plants commonly seen in New Zealand and could certainly be chosen as a basis for planting in exposed localities:

Abutilon vitifolium.

Acacia spp.

Azara microphylla.

Azaleas—The varieties 'Hinomayo', 'Kokin-shita' and 'Gumpo' are mentioned in particular.

Berberis darwinii.

Berberis stenophylla coccinea.

Buddleia nanhoensis, *B. Ile de France* and *B. globosa*.

Calluna varieties.

Camellia japonica vars. *Sylvia*, *Jupiter*, *Kelvingtonii* and *Adolphe Andusson*.

C. sasanqua vars.

Caryopteris clandonensis.

Cistus Silver Pink and *C. Ioretii*.

Clematis flammula and *C. montana*.

Convolvulus cneorum.

Cordyline australis.
Cornus capitata, *C. kousa*.
Corokia spp.
Correa virens.
Cotoneaster spp.
Cydonia spp.
Cytisus spp.
Daphne collina, *D. retusa*, *D. japonica* and *D. 'Somerset'*.
Deutzia spp.
Drimys aromatica.
Embothrium longifolium, *E. 'Norquinco'*.
Erica carnea and hybrids, *E. mediterranea superba*,
E. arborea, *E. vagans* varieties.
Escallonia Donard Seedling, *E. Appleblossom*.
Eucalyptus coccifera.
Eucryphia cordifolia.
Eupatorium micranthum.
Exochorda macrantha.
Euphorbia mellifera.
Feijoa sellowiana.
Fuchsia riccartonii, *F. gracilis*.
Genista hispanica, *G. cinerea*.
Grevillea rosmarinifolia.
Hippophae rhamnoides.
Hoheria spp., especially *H. angustifolia*.
Holboellia latifolia (climber).
Hydrangea maritima.
Hymenanchera crassifolia.
Hypericum 'Rowallane Hybrid' and *H. patulum Forrestii*.
Ilex spp.
Juniperus—low-growing forms.
Laburnum alpinum.
Leptospermum ericoides, *L. scoparium* varieties.
Lomatia ferruginea.
Lupinus arboreus.
Lyonothamnus asplenifolius.
Lonicera periclymenum (climber).
Medicago arborea.
Metrosideros lucida, *M. robusta*.
Myrtus luma, *M. lechleriana*, *M. tarentina*.
Olearia spp.
Paulownia tomentosa, *P. fargesii*.
Pernettya mucronata.
Phillyrea.
Pittosporum spp.
Potentilla—shrubby spp.

Japanese Cherries such as 'Tai-Haku', 'Jonioi', and 'Hokusai'.

Pyracantha spp.

Pieris taiwanensis.

Rhododendrons—Several species and varieties are mentioned including: *R. ponticum*, *ledoides*, *impeditum*, *cantabile*, *sargentianum*, *calostrotum*, *oleifolium*, *ciliatum*, 'Praecox', *rubiginosum*, *mucronulatum*, *tephropeplum*, *deleense*, *glaucum*, *ravum*, *yunnanense*, *chartophyllum*, *hormophorum*, *davidsonianum*, *pseudo-yanthinum*, *russautinii*, *cinnabarinum* Roylei, *madonii*, *crassum*.

Ribes spp.

Rosa moyesii.

Salix daphnoides.

Santolina.

Skimmia.

Sorbus aria.

Spartium junceum.

Sophora microphylla.

Tamarisk spp.

Trachelospermum jasminoides.

Vaccinium mortinia.

Veronica (Hebe) spp.

Viburnum carlesii, *V. tinus*.

Weigelia spp.

Wistaria sinensis.

Yucca spp.

Zenobia spp.

It is interesting to compare this list of trees and shrubs with examples growing in windy, exposed positions in New Zealand. Many well-tryed subjects one would expect to find, but I feel certain that a far greater range is possible. One would not expect to find amongst wind-resistant trees the large leaved *Paulownia tomentosa* but recent planting at Lincoln College supports Mr Arnold-Foster's observations. We have found that this particular species has proved remarkably tolerant.

In view of the fact that many of the most popular garden plants must have shelter, it is imperative that careful thought be given to the first and second line of defence against wind. We can profit by the experience and the mistakes of others and as a result save years of disappointment. In a country such as New Zealand where climatic conditions vary so considerably from district to district, local knowledge is of prime importance. Before deciding on a planting scheme for trees and shrubs, have a good look around the locality with a pencil and a note-book. It will be time well spent.

DOGS

A. K. McLay

Heading Dogs

To really appreciate a good heading dog he should be seen at work on the hills. His job is to head and bring back or turn sheep that are going the wrong way. Trial dogs are sometimes a breed apart from workers. While performing beautifully in trials they are sometimes useless on the rough hill-country. For high back-country, timid sheep and rough going, a silent heading dog is needed. If a dog yelps and barks going out in rough country, his chances of heading wild Merino wethers are nil; they can travel faster than he can. These dogs have a wonderful aptitude for their work and show great intelligence and skill when on the job. They can often do the work without any further guidance from the shepherd after he has sent them out.

A good heading dog is a wonderful animal and is usually regarded as No. 1 dog in the pack. When they know the country, some are capable of doing a "beat" themselves. The performances of these dogs are legendary. Old musterers can always tell tales of wonderful runs by old "Trip," "Don," or "Boss" and most of these are genuine eye dogs. This type of dog is very good at controlling a few timid sheep. His attention is never taken off them. He is watching them intently and can anticipate any move they may make and forestall it. Most of our trial dogs are of this type. They are usually silent workers and always face their sheep. Under command these dogs can be moved and directed a few inches at a time. They will stand or lie perfectly still watching their sheep. These make the best lambing dogs. When the dogs are trained for this work the shepherd can catch a ewe without disturbing her or the rest of the flock.

Leading Dogs

For droving work these dogs are indispensable. They keep a mob together and prevent faster and stronger sheep from travelling too fast. A good leading dog can be trusted to hold his own sheep and prevent them getting boxed with any other mob along the road. Sheep soon learn to follow the dog who keeps ahead about ten to 20 yards away. Under command of his owner, he will stop the sheep and pull them back as required. Some dogs have a natural aptitude for this work. Some heading dogs are also good leaders and most can be taught to lead.

Huntaway Dogs

These, as the name implies, are a strain for driving sheep away; they are almost indispensable in a mustering

pack. They are usually noisy dogs with plenty of bark and driving force. They are very often used for "slewing" sheep when mustering.

General Purpose Dogs

These are not trial winners. They may make quite a few mistakes, but they never quit. On hot days or in heavy going, they are always on the job. With one of these dogs you never realise how much he does until something happens to him, or he has been left at home for a spell.

Other Types of Dogs

"Homely Dick" is one who goes off home when tired or growled at. He is not fond of hard work. He can sometimes be cured if he gets a warm reception when he arrives home and some arrangement can be made to return him to his owner out on the run.

One Runners

They will give you one good run per day and after that are liable to do or not to do as they feel inclined. They are good dogs to give a trial run with and then sell.

Wanderers

These are no good because they are never at home when needed. They are an annoyance to all tied-up dogs and to neighbours. Sometimes they turn to worrying.

Worrying Dogs

These often develop their bad habits because of lack of care on the part of the owner; sometimes by running with sporting dogs. If underfed, a dog may take to sheepskins left on the rails. Very often they cause serious damage among stud and paddock sheep. Seldom are they found with a collar on. The cure is to shoot on sight.

Cunning Dogs and Sneaks

They will dodge an angry owner and cannot be relied on when your back is turned. They will have a go at a beaten dog in a dog fight. They usually are not tolerated very long by a good shepherd or musterer.

Car Chasers

They will get caught sooner or later but are a grave danger to other people. No-one likes to run over dogs and a nasty accident can occur when trying to dodge them. Car chasers are hard to cure.

Dogs which Bark when on the Chain

This is due to bad training when young. They are usually alright when kept shut up close at night. A stray dog running around can cause the others to bark at night. Some seem to be affected by the moonlight and will perform when there is a bright moon.

Dogs which Bite in Work

These are usually team workers and may bite when excited or when forced into sticky sheep. Sometimes when the dog is tired and the sheep are sticky he will nip their legs or have a mouthful of the flank. Some strains of workers are worse than others for this habit. It seems to be hereditary. It is not safe to use them in the yards and at dipping. A method of prevention is to put a light piece of wire in the nose. This is frowned on by the S.P.C.A. but it does less damage than that done by hidings given him by his owner.

Fighting Dogs

Plenty of hard work is a good deterrent for these. The habit is often caused by older dogs bullying a pup. This may cause him to develop a surly nature and as he gets bigger and stronger he will tend to bully other dogs. He can be an awful nuisance in mustering packs. He is usually a one-man dog.

To Motorists

Exercise extreme care when passing or meeting working dogs. Remember it takes sometimes two years to make a good dog; you can kill him in two seconds. I never blame a shepherd or drover who calls his dogs in when a speeding motorist comes along. Slow down or even stop and then most drovers will run a dog to assist you to get past or through a mob of sheep.

CONIFERS

L. W. McCaskill

(Continued)

3. *P. nivalis*. Previously given the common name of mountain totara this plant at the request of the Botany Division, D.S.I.R., should be called snow totara. It is usually found in sub-alpine localities up to nearly 6,000 feet where it often assists in holding loose scree slopes. Its dwarf habit makes it a useful plant for the rock garden.

4. *P. spicatus* (flowers in a spike). Matai or black pine. Young plants consist of a mass of slender, twisting, drooping branchlets with small leaves of a bronzy tint confined mainly to the tips or scattered down the stems. Leaves of adult plants are half an inch or less long and are characterised by coming rapidly to a point. The flowers are dioecious, both male and female being arranged in definite spikes. The fruit is black, or nearly so, rounded and succulent, up to one

third of an inch in diameter. The fleshy base found in totara is absent. One aid to identification of matai is the way in which pieces of the old bark flake off revealing a rich, reddish-brown colour beneath.

When fully grown, matai reaches a height of 80 feet with a trunk of up to three feet in diameter. Such a tree would be a very great age. The rate of growth of matai is considered to be the slowest of all the New Zealand pines and an inch of timber near the centre of the trunk may have as many as 80 rings.

The timber of matai is very durable out of the ground. It is now rather scarce but where it can be obtained it is still the best native timber for the floors of public buildings and for verandahs.

Old matai trees often have in them what is called a heart-shake, a hole or cavity in the heart-wood. In these cavities there is often an accumulation of liquid which provides a refreshing beverage for a bushman.

The Maoris used the thin, pliable, tough branchlets of young trees for the making of eel pots.

In Polynesia all native peoples use some kind of a drum. The Maori did not know how to make the type of drum with the ends made of the skin of some animal. Instead he used two kinds of wooden gong made from the wood of matai. One was just a large plank hewn from a log. The other was much more elaborate and was fashioned in the form of a canoe with the interior hollowed out through a very narrow slit. Such a gong would be hung on the high platform on which the night-watchman was stationed. He would occasionally strike the gong with a wooden club to let any prowling enemies know that the garrison was on the alert.

A very primitive musical instrument was made from a piece of matai about 15 inches long and one inch thick. This was struck with a smaller piece to produce a tapping sound. Usually one end of the long piece was held between the teeth the other in the fingers of the left hand. As the wood was struck with the tapper, the sound would be varied by opening or closing the lips.

5. *P. ferrugineus* (rusty) Miro.

The leaves are from half to one inch long, narrow, and gradually tapering to a point (cf. matai). The general appearance and the arrangement in two rows make small branches look much like those of Yew or of Californian redwood as well as those of matai. Pollen and seed flowers are produced on separate trees. Male catkins are found singly in the axils of the leaves which they may equal in length. Seed flowers consist of a single, naked ovule on a short stalk which is clothed with minute bracts. The fruit is large,

like a small plum, about three-quarters of an inch long, reddish-purple in colour, and when fresh covered with a waxy powder.

Flowers are produced in October and November and the fruit does not ripen until the winter. During July and August miro berries form an important food of the New Zealand pigeon. The berries make the birds thirsty, a fact well known to the Maori who would set his snares by streams near miro trees. The snares were usually made from strips of the leaves of the cabbage tree as this fibre is much more durable than that of flax. The strips would be hung in the smoke of a wood fire to give them an old appearance and to make them tougher. "The Maori would cover the surface of a stream with fronds of tree ferns but would leave certain clear spaces where the thirsty birds might drink. Round those spaces he set his snares so closely that a bird could not put its head down to the water without getting caught in a noose. A rod laid down in a horizontal position as an alighting place for the birds enabled the fowler to set his snares evenly."

If no stream was available near a miro tree, the Maori would take the water to the birds. He would hew a trough from a log of wood and place it in the tree or on two posts beneath the tree. The trough would be filled with water and the snares arranged on both sides. Charms would be repeated by the fowler to help provoke thirst in the birds.

The timber of miro is much like that of matai in appearance. It is straight in the grain, hard, and of great strength. This strength makes it suitable for beams required to carry a heavy roof. Most of the miro sawn in the bush is mixed with rimu for sale and is used for similar purposes, especially for weather-boarding. It must not be used in contact with the ground as it decays rapidly in such a situation.

After the Maori learned the use of medicines from the pakeha, he experimented with all kinds of plants. He found that the gum from the trunk of miro was quite a good ointment for healing wounds. If warmed in the hand it gives off a substance which, if inhaled, will soothe a sore throat or chest.

6. *P. dacrydioides* (like *dacrydium*). Kahikatea or white pine.

The leaves are of two forms. Those of young trees are arranged in two rows, up to one quarter of an inch long and linear. In the mature trees the leaves are never more than one eighth of an inch long and are set in all round the branch and pressed very close to it. The flowers are dioecious. The male catkins are less than one-quarter of an inch long and occur singly at the tips of the branchlets.

The female flowers are found in a similar situation but are very minute—just a few scales on which a single naked ovule is borne. After fertilisation these scales increase rapidly in size to form a bright-red, succulent mass on which a small black nut is seated. A tree covered with a multitude of such fruits is a striking sight, one beloved of the Maori and pigeon of old and of the starling and blackbird today.

“A virgin kahikatea forest affords one of the most striking sights in New Zealand scenery. Straight unbranched trunks rise one after the other in endless series in such close proximity that at a short distance no trace of foliage is visible except overhead or in the immediate vicinity of the observer. The naked, symmetrical shafts, tapering almost imperceptibly, appear to form dense walls which completely shut out every glimpse of the outer world.” Though written over one hundred years ago, that description would apply to a few of our forests today, even to a section of Riccarton Bush in the heart of Christchurch.

Captain Cook discovered the kahikatea. He tells in his journal of visiting the forests between the Thames and the Piako rivers and measuring one 89 feet to the first branch with a circumference of 20 feet measured six feet from the ground. He says, “It was straight as an arrow and tapered but little in proportion to its height, so I judged there were 350 cubic feet of solid timber in it exclusive of the branches. As we advanced, we saw many others that were still larger.” Where Cook rowed in his boat on the outskirts of the largest forest of its kind in New Zealand, is now dry land inhabited by herds of dairy cows.

In the distance, the kahikatea may be recognised by the long, straight trunk covered with greyish-brown bark, the whole surmounted by a somewhat thin crown. Old trees usually have buttresses at the base. Unlike other New Zealand conifers, this species grows usually in almost pure stands. It alone of our important timber trees can cope with excess of moisture in the soil, hence we find it the dominant tree in swamps, the edges of rivers, valleys, lakes and lagoons—multitudes of long, straight trunks like the masts of ships.

Because of its straightness and freedom from knots, the timber was one of the first to be used by the white man. Especially in the south where there was no kauri, it was valued by whalers for spars. Because of the absence of smell or taste, the white colour, the ease of working and the property of taking nails without splitting it made the perfect container for dairy produce, especially for butter for many years. It was also used for making containers

for confectionery, stationery, soap, candles, fruit, poultry and tallow.

The Maoris ate the berries of the kahikatea when short of larger fruits. When a decayed tree was found, the heart-wood was eagerly sought and used for making implements and weapons. This wood carried to a fine point without breaking and was so hard that points of spears made from it required no further hardening. Small pieces of heart-wood were used to make torches for night fishing and travelling. Similar pieces were tied loosely together to form a rattle. This was fastened to the neck of the Maori dog when used to hunt kiwi and kakapo at night. The Maoris followed the noise of the rattle.

The finest pigment for tattooing the face was made by burning kahikatea resin. Occasionally suitable logs were used for making canoes.

The late Mr R. M. Laing in "Plants of New Zealand" quoted a tale of the Nga-potiki Maoris concerning the origin of the tree. "A chief named Pou-ranga-hua was blown out to sea in his canoe and cast ashore on the island of Hawaiki. Here he lived for some time but longed to return to his wife and home. His canoe, however, was destroyed and he had no means of reaching the mainland. At last he begged a huge bird, Tawahaitari, to fly with him to Aotearoa. On approaching the mainland Pou reached out his hand and from under the wings of the great bird pulled out some of its finest and downiest plumes which he threw into the ocean. From these plumes arose a lofty tree which still bears fruit in the midst of the waters. A branch of this was broken off by the wind and cast ashore. From this branch came all the kahikatea forests in New Zealand."

Dacrydium

1. *Dacrydium cupressinum*. (The first name comes from the Greek dakru, tear, on account of the resinous exudations from the bark; the second name means cypress-like.) Rimu. Red pine.

Often known as "Queen of the Forest", rimu is certainly the most graceful of all our forest trees. It is also one of the tallest; at least one specimen was measured at 198 feet. The graceful, pendulous twigs and branches, especially of a young tree, give a general drooping appearance which makes for easy identification. No garden of any size should be without a rimu. Even in Canterbury rimu does well if given some shelter from the nor'-west winds and direct sunshine. But seedlings should not be torn from the bush and planted immediately in their permanent position; rather should they be potted up or hardened off in a sheltered place in good nursery soil.

In the seedling, the leaves are somewhat awl-shaped, nearly half an inch long, lax and open. As the plant grows, the leaves decrease in length and become roughly three-sided, smaller, rigid, and close-set on the branches. "The leaves are then really only small prickles, running up a long stem, from which branch out other small stems whose united weight causes the main stem to hang like the branches of the weeping willow".

Male and female flowers are found on separate trees. As they occur only on adult trees they are difficult to find unless we happen to be present when such a tree is felled. The pollen flowers are merely little green catkins found at the ends of small, upright branchlets. A female flower may be found at the tip of a curved branchlet. The resulting fruit, though small, is very handsome. It consists of a bluish-black nut, about an eighth of an inch long, set in a little red cup. The function of this cup is to attract birds which swallow the whole fruit but do not digest the seeds.

Because of its prevalence and wide distribution throughout New Zealand, in many cases in pure stands, rimu has long been the most important of our forest trees. The timber when first cut is reddish-brown, changing when seasoned to a light-brown with darker and lighter streaks. It has long been the main timber used in house building. Specially-selected timber is used for furniture, doors, paneling and ceilings.

Once the Maoris became herbalists after contact with the Pakeha, they used rimu gum and also the wet inner-bark as dressings for severe wounds. Always disliking the dark they made torches from the resinous heart-timber and even from the partly decayed wood. It was split into small pieces which were tied in bundles and ignited. By regularly knocking off the ashes they could get a continuous light from such torches. Even the small dry twigs tied together made quite serviceable torches in an emergency.

Maori legend explains why the timber, along with that of some other trees, may be red in colour. "When Maui killed the taniwha, he cut it in pieces, but though in the form of the taniwha it no longer lived, new shapes were assumed by its dismembered body. From the head, flung into the sea, came the huge, twisting conger eel; from its trunk, flung into a stream, arose the slimy tuna. A noisy kakariki sat watching the conflict and its head was splashed with blood. Red it has remained until the present day. A pukeko, too, running past, had its beak and legs smeared with blood; nor has it to this day been able to remove the stain, though it constantly wades through cleansing water.

The neighbouring trees were also splashed with blood: even now you can see the kinds affected—rimu, totara, matai and tawhai—cut any of these and you will find the sap-wood red, the hue of blood.”

Captain Cook knew the rimu well. He called it “spruce” and from it made his famous spruce beer which his sailors had to drink as a precaution against scurvy. He found that the drink was improved if manuka leaves were also used. He was probably the first man to call manuka by the name “tea-tree”. Here is Cook’s recipe.

“Make a strong decoction from the small branches of the spruce and tea plants by boiling them for three or four hours or until the bark will strip with ease; then take them out of the copper and put in the proper quantity of molasses, ten gallons of which is sufficient to make a ton or 240 gallons of beer. Let the mixture just boil then put it into casks. To it add an equal quantity of cold water, more or less according to the strength of the decoction or your taste. When the whole is milk warm, put in a little yeast or grounds of beer or anything else that will cause fermentation and in a few days the beer will be fit to drink”.

The Royal Society of England presented Cook with a medal for his work in making this beer and saving his men from scurvy.

2. *D. colensoi* (after Colenso, the missionary-botanist), Silver Pine.

This is a small tree, rarely as much as 40 feet high, conical in form, and with slender branchlets. In the juvenile form, which may persist for many years, the leaves are up to half an inch long, narrow and soft. Gradually, as the adult stage develops, the leaves become small and scale-like and tightly pressed against the stem.

Male and female flowers occur on separate trees and always at the tips of the branchlets. The fruit is a black, shiny nut, only one-twelfth of an inch long, with nearly half of it enclosed in a cup-shaped aril.

The timber is whitish when the tree is first cut; it then turns to yellowish-brown. It is straight in the grain and very easy to work and mottled samples are highly valued for cabinet work. Owing to its extreme durability it has been widely used for posts, railway sleepers and telegraph poles. Large areas in Westland have been cleared in recent years to supply the demand for fencing posts. If undisturbed, these areas often come up thickly in silver pine seedlings which, in a very long time, will provide a second cutting.

3. *D. intermedium* (in between), Yellow Silver Pine.

This is very similar to the previous species but both the leaves and the nuts are larger. The characteristics of the timber are similar to those of silver pine but the tree is often too small to make milling a payable proposition.

4. *D. laxifolium* (lax or loose-leaved), Pygmy Pine.

This is the smallest pine in the world. It is found mainly in the mountains at a height of 2,500 to 4,000 feet but descends to sea-level on Stewart Island. It is a small, prostrate shrub with very slender branches trailing across the surface and up to two feet in length. Occasionally it grows as a small shrub but is rarely two feet in height. Male and female flowers may occur on separate plants or on the same plant and the little black nuts sitting in their crimson arils may sometimes be found on specimens only three inches across. Pygmy pine makes an excellent trailing plant for the rock garden.

5. *D. biforme* (of two forms), Pink Pine.

This is sometimes known as Yellow Pine. It grows mainly above 2,000 feet but descends to sea-level in the south-west of the South Island and on Stewart Island. In favourable conditions of soil and climate it may make a large tree but is usually less than 30 feet high. In the mountains it often occurs as a ball-shaped shrub only four or five feet high.

The leaves of young plants and those on the lower branches of older plants are up to three-quarters of an inch long; those of adult plants are minute, scale-like and closely pressed to the branches. The fruit is an oblong black nut about one-tenth of an inch long.

Although ultimately a tree, pink pine is such a slow grower, it makes a very useful shrub for the rock garden or border.

6. *D. bidwillii* (after Bidwill a farmer-botanist), Mountain Pine or Bog Pine.

This is a closely-branched shrub growing up to ten feet high but usually only half that. It grows mainly in the mountains above 2,000 feet, except in the south where it may come down to sea-level.

The fruit is a small nut marked with fine, longitudinal lines. It usually sits in a white aril but this latter does not always develop.

Mountain pine should be well known to visitors to the Hermitage at Mt. Cook, for it is the common, rounded shrub growing on the Hermitage fan. It makes an excellent garden shrub.

BOOK REVIEW

Beyond the Waimakariri—A Regional History. D. N. Hawkins, 465 pp., 63 illus., Whitcombe and Tombs Ltd.

This book, packed with local detail about the settlement and development of the area between the Waimakariri and Waipara rivers, is the result of co-operation between five counties and two boroughs and the Canterbury Centennial Association. From the point of view of social history it is of special interest in that it gives due recognition to the story of the small farmer practising mixed cropping and livestock raising, a man who has been given less than is his due in most other local histories.

Anyone interested in horticulture will appreciate the description of the founding of Ivory's Nurseries which have been continuously in production since 1859. The establishment of the nurseries by William Ivory enabled the early settlers to plant their farms with shelter and ornamental trees and their orchards with high-quality fruit trees. "He purchased a section at Rangiora, without even inspecting it. All his family's belongings had to be transported over the bridle track from Lyttelton, including a seventy-pound feather bed which he himself carried over one morning before breakfast". The section turned out to be but part of a waste of nigger-head, flax and toe-toe swamp but the soil proved to be good.

Full credit is given to the Ensor family and their work in particular with the production of Corriedale sheep. Little's first flock had been started in North Canterbury in 1878. "In 1889 Charles Ensor of Mount Grey mated fine-combing Merino ewes with English Leicester rams and for a number of years inbred the progeny without resorting to outside blood, except for some pure Corriedale rams from the Land Company", which first crossed Merino ewes and Lincoln rams at the Levels in 1874. "The Leicester basis of the Ensor breed ensured a first-class fine-count fleece. the Merino bequeathed its wandering instinct and hardiness, and judicious care evolved a shapely carcass for the stock buyer. Sires from the elder Charles Ensor's original flock provided the basis for five other studs in the Ensor family as well as nine others in the area.

The profound effects which modern transport has had on industries based on farm produce is well brought out. "Over the past 20 years all the creameries and dairy factories have closed, and the flour mills have dwindled to three. All flax-milling is now concentrated in the one Wai-kuku mill. The Rangiora saleyards, which once handled thousands of sheep and cattle and large quantities of pro-

duce every Tuesday and as many as 250 horses on a Friday, have recently been closed. Centralisation and the nearby presence of Christchurch have had wide repercussions."

In the chapter on education the story of Rangiora High School will be of interest to teachers and others everywhere. Founded in 1873, for the first five years the school was divided into boys' and girls' departments but "J. P. Restell, the inspector, persuaded the committee to have mixed classes in the interests of economy and efficiency. This move was regarded with horror in some quarters." The Rev. B. W. Dudley insisted on a public meeting and to over 400 people he contended "that girls should not be educated to the degree imposed upon boys, that the nobility educated their sexes apart, that in Christchurch they were separated by high brick walls, and that there were instances where overworked female brains had suffered fatal results. Also was there not a danger of acquaintanceship at school leading to an undesirable marriage? Henry Blackett objected to children of older families mixing with new immigrants who were, he suggested, the sweepings of English cities. Cunningham, speaking for the committee, claimed that there were only six segregated schools in Canterbury and that the children were the 'picture of perfect innocence'."

In spite of an unfavourable decision by the meeting the authorities completed their conversion plan and the school never looked back. (Incidentally the new headmaster and the headmistress were married not long after.) The author gives full credit to J. E. Strachan, headmaster from 1917 to 1948 for blazing new trails including a vocational curriculum integrated with the life and activities of the community it served; the insistence on basic core subjects (a system now universal in New Zealand); the institution of the first school council whereby the pupils were given a measure of self-government and practical instruction in committee administration: a farming course closely associated with a school farm; instruction in home science for girls, training in child-care at an attached nursery school; the promotion of a joint association of local primary and post-primary teachers; and the development of the Community Centre movement.

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