

HISTORY OF THE SELWYN PLANTATION BOARD

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Introduction

In most parts of New Zealand early settlers were confronted with clearing forests to make farms, but not so in Canterbury. Evidence of charred totara logs on the foothills and outlying spur ranges indicated that the extent of the forests in Canterbury was far greater at one time than the earliest whites discovered. In 1850 three types existed, kahikatea in the swamps, mixed podocarps on Banks Peninsula and downs, and the beech forests on the upper foot-hills. The total area in 1830 has been estimated at 300,000 acres but was reduced to 180,000 acres by 1873. (1)

The plains themselves were treeless, and from 1858 various acts were passed for the encouragement of tree planting, first by the Provincial and then by the Central Government. Subsidies or grants of land for individuals, subsidies for local bodies, and certain benefits for Crown tenants were the various methods used by the authorities. Under the Forest Trees Planting Encouragement Act of 1871 farmers were given two acres of rural land from waste lands of the Crown for every acre planted in trees. This grant applied to any area planted between 20 and 250 acres. In 1872 the Act was amended and the Land Order was introduced, whereby a farmer received up to £4 per acre of planted trees, and the order could be used within two years to purchase Crown Land. In 1879 the Act was amended again to enable County Councils, Highway Boards, Road Boards and Borough Councils to receive all the benefits under the provisions of the Forest Trees Planting Encouragement Act, 1871, and Amendment Act, 1872. In 1908, Sec. 328 of the Land Act provided for "joint ownership of reserves by local authorities," and in 1910, Sec. 77 of Reserves and Other Lands Disposal and Public Bodies Empowering Act provided for the setting up of the Selwyn Plantation Board, and the Constitution was published in the *N.Z. Gazette* of 18th May, 1911.

History of the Reserves administered by the Selwyn Plantation Board

In 1879, 32,000 acres of Crown Land were set aside for plantation purposes mainly in the Selwyn, Ashburton, and Mackenzie Counties.

These reserves were narrow strips of land, usually ten to fifteen chains wide, alongside roads and scattered over the plains. Original vestings in many cases consisted of strips running into the nor'west, but within a few years these were exchanged for strips running in the opposite direction, i.e. across the direction of the prevailing wind.

A special body called the Canterbury Plantation Board was formed in 1879 to administer the reserves. The Board consisted of eight members representing the County Councils and the Land Board. Its funds came from rents of the reserves supplemented by grants from the Councils, such grants being charged against the Road Districts in which the money was expended. Almost 2,000 acres were planted in various species—mostly *Eucalyptus* spp. and *Acacia dealbata*—with a small percentage of conifers. There is no information available as to the revenue and expenditure of the Board or the total amount of grants made by the County Councils.

In 1885 the Canterbury Plantation Board went out of existence and the reserves were vested in the Selwyn and Ashburton County Councils in their respective areas, the remainder being administered by the Lands Department. The Selwyn County, consisting of all the land between the Rakaia and Waimakariri Rivers, from the main divide to the sea except for the Peninsula and the City of Christchurch, administered more than 15,900 acres of plantation reserves. Of this area about 1,200 acres had been planted by the Canterbury Plantation Board, and during the period 1885-1910 the Selwyn County Council planted 5,200 acres, financing the work from revenue from the leased reserves.

Various eucalypts and insignis pine (*P. radiata*) were the main species planted, but small areas of larch (*L. decidua*), Douglas fir (*Pseudotsuga taxifolia*), spruce (*Picea abies*), Corsican pine (*P. laricio*) and oak (*Q. pedunculata*) were established experimentally. In almost all cases the land was cultivated, and sometimes a crop of turnips grown and fed off prior to planting. If the tenant were prepared to grow turnips, he was given the reserve rent free for the last year of his term. Eucalypts were direct sown, other species being planted at 10 by 10 ft. spacing, using two and three-year-old trees supplied and planted by a contracting nurseryman.

Formation of the Selwyn Plantation Board

In 1909, first the Tawera County and then the Waimairi County were formed, and in 1910 the remainder of the Selwyn County was divided up into seven small counties (Selwyn, Malvern, Paparua, Springs, Ellesmere, Heathcote and Halswell) and the Spreydon Borough.

The problem of the future administration of the plantation reserves arose, and the Selwyn Council, influenced largely by one of its members, the late George Witty, then member of Parliament for the district, decided that a special Board should be set up for this purpose. In the Reserves and Other Lands Disposal and Public Bodies Empowering Act, 1910, the Selwyn Plantation Board was set up, and regulations brought down the following year. The Board consisted of one representative from each of the nine constituent counties and one from the Spreydon Borough, with the Commissioner

of Crown Lands as Chairman. Later, when Spreydon was absorbed in the City, the Christchurch City Council obtained the right to appoint one member.

The Board was set up to control and administer the 15,900 acres of plantation reserves of which 6,400 acres had already been planted and 9,500 acres were leased for agricultural and pastoral purposes. The original vesting of all these reserves had been for the eventual provision of both shelter and firewood.

The Selwyn County Council handed over to the new Board £3/5/6 in cash while the leased reserves brought in about £1,350 a year. Under the regulations all net revenue was to be used for forestry purposes. On May 29th, 1911, the Board held its first meeting and a Secretary and Caretaker were appointed but, except for a small area of 30 acres planted in Corsican and ponderosa pines and larch in 1912, no new planting was done until 1919. The then Superintending Nurseryman for the South Island, an Officer of the Forestry Branch of the Lands Department, was adviser to the Board, but shortage of finance and economic conditions due to the war did not allow anything more than maintenance to be carried out. It was not until the appointment of the late R. G. Robinson as Superintendent of Reserves in 1918 that any more afforestation was carried out. But from then on, as revenue increased from the sale of forest produce, steady progress has been made until to-day the forest area stands at 12,848 acres.

Description of Reserves

The reserves number 119 and are scattered over the plains from Rolleston to the Acheron River and Porter's Pass. They vary in area from five to more than 1,300 acres, and cover a wide range of sites. Stratified alluvial gravel forms the foundation of the plains, and the overlying soil varies from a few inches to more than a foot. It is a light loam and not very retentive of moisture. Plantations are established from Rolleston (182 ft.) to Springfield (1,264 ft.) and Windwhistle (1,265 ft.), with the bulk of the area lying between 300 and 800 feet.

Rainfall varies from 25 inches at Rolleston to 43 inches at Windwhistle, and is not evenly distributed. The area is subject to summer drought; the prevailing nor'west wind hastens evaporation and causes low relative humidities. Winters are severe and between 90 and 100 frosts are experienced. In an average year these range up to 20°F. with extremes up to 27°F. usually following heavy snowfalls. Snow is usual, but normally is not heavy; periodically there are falls of up to 24 inches over most of the Board's area.

Species and Age Classes

Site limits the choice of species and, except for the higher rainfall areas nearer the foot-hills, insignis pine is the only successful commercial species. The site is not suitable for eucalypts although on

the better land *E. viminalis* and *E. obliqua* have done reasonably well. At times dry seasons have caused heavy mortality, particularly in *E. globulus*. Heavy frosts have also killed *E. globulus* and other species. *Acacia dealbata* served its purpose of quick shelter, but commercially shows a poor return and is no longer planted.

The following table gives the existing plantations by species and age classes :—

TABLE I
Selwyn Plantation Board: Species by Age Classes.

Species	Period							Totals
	1880– 1890	1891– 1900	1901– 1910	1911– 1920	1921– 1930	1931– 1940	1941– 1950	
	Area—Acres							
Eucalyptus spp.	668	461						1129
Acacia dealbata	335	674	130					1139
Euc. & Acacia	522	97						619
P. radiata		180	63	9	2115*	3010	2946	8323
Ps. taxifolia					459	47	374	880
P. ponderosa					148	8		156
P. laricio					41			41
L. decidua		55						55
Mixed conifers		217	55	32	70	132		506
Totals	1525	1684	248	41	2833	3197	3320	12,848

* Includes 848 acres blown down in 1945.

Silviculture

The Board collects its own seed from selected trees. Douglas fir is sown in beds in October, and insignis pine with a Planet Junior drill in lines late in November. The Douglas fir is lined out as yearlings and planted as 1/2 or 1/3 stock. The insignis pine stays in the drills and is planted as two-year seedlings. All trees are wrenched and, as the nursery at Darfield is on medium light land, they are hardy and normally transplant well.

Improved planting technique over the last few years has resulted in cheap establishment of plantations. Strips are ploughed ten feet apart with a three-furrow plough, the tractor being run back over the middle furrow, sometimes pulling a gang of discs. The ground is well prepared by this method and it has the advantage over ploughing the whole area as the trees, when a few years old, have their roots in solid ground and offer more resistance to wind throw. Trees are planted nine or ten feet apart according to site. By this method areas of insignis pine can be established for £1/11/- per acre, excluding the cost of the trees. Prior to the use of the plough, pitting was the common practice and still is for replanting logged areas.

A planting plough has been developed and, although limited in its use, when the land is suitable three men can plant 8,000 two-year

insignis pine seedlings a day. The strike is not as good as on ploughed land but compares favourably with that on pitted land.

In logged insignis pine stands, natural regeneration is irregular and on the whole poor, so that almost complete replanting is necessary. The experience on the plains is quite different from that in the Rotorua district due probably to lower rainfall and humidity.

In the past Douglas fir has been planted on the better sites on the plains, but in future will be confined to the downs.

Usually the first treatment after establishment is to go through the stand with secateurs when three years old to remove double leaders. Pruning of all trees to seven feet is carried out when the stand height is about thirty feet and lower branches are showing signs of suppression. Axes are used in preference to saws as the work is cheaper and with experienced men the pruning is efficient. High pruning to fifteen feet is done only on final crop trees. So far it has been possible to keep up with this cultural work, but as the average annual planting since 1940 has exceeded four hundred acres, labour will have to be more plentiful from now on if all areas are to be treated.

Thinning has not been possible for the last four years. Prior to that 800 acres had been thinned and in future this work will become routine.

Protection

By far the most destructive agency is wind, and since 1911 four nor'west gales have caused major damage—1914, 1930, and two in 1945. The damage has occurred after heavy rain when the ground is thoroughly saturated; in 1945 gusts of 90 miles an hour were recorded. The 1945 gales—13th July and 1st September—brought down 414 acres of mature insignis pine and 866 acres in the twenty to twenty-five age class containing 36,000,000 ft. b.m. Wider spacing and more intensive thinning in order to develop a deep crowned tree appear at present to be the only means of lessening the danger of wind throw. Douglas fir proved more resistant but, as stated previously, planting of this species is restricted by site. There is no doubt that wind is the limiting factor in forestry on the Canterbury Plains, and it certainly makes it a risky business. But it was primarily to give shelter from wind that the reserves were set aside, and the Board and individual farmers have improved conditions by tree planting.

The hot dry nor'west wind in the summer aggravates the fire danger, and the rate of spread of a grass, scrub or forest fire in Canterbury under its influence is probably faster than anywhere else in New Zealand. Fortunately the community is fire conscious and an excellent fire protection organisation on a voluntary basis has been developed in Canterbury. The Forest and Rural Fires Act, 1947, gave the County Councils authority and, in Canterbury in general and the Board's area in particular, fire protection has reached a high

level of efficiency. Fire protection last year cost $1/2\frac{1}{2}$ per planted acre. Major equipment consists of centrifugal pumps driven by petrol motors mounted on trucks with 400 gallon tanks of water. Delivery is by canvas hose and variable nozzles. Each unit when complete costs less than £180. Similar units are owned by County Councils, farmers and other organisations; progress in fire control has been spectacular in the last five years.

The Board's losses by fires have been slight, perhaps the most costly being a fire in 1948 which burnt 178 acres of blown-down insignis pine 24 years old.

The South Island Main Trunk and Midland Railway lines run through the Board's area and locomotives are responsible for more fires than any other cause. Farmers' tractors and headers are the next worst offenders, and there are still careless individuals responsible for the odd fire, but fortunately this type of fire is getting less each year as the public generally becomes more fire-minded.

Snow has caused damage in broken leaders and snow throw particularly in the three heavy falls of 1935, 1943 and 1945. Again, better thinning is probably required to lessen the damage, and it is hoped to carry this out in future.

Heavy frosts are liable to cause damage to newly planted trees and delay planting in winter. Unseasonable heavy frosts in November have damaged Douglas fir. Frosts following the snow of 1943 and 1945 killed most of the wattle and some of the eucalypts. However, unseasonable frosts such as those experienced in the Rotorua region are rare.

Of the insects, *Sirex noctilio* and *Hylastes ater* are the two most important; so far *Hylastes* is doing the most damage. Logged areas cannot be replanted with safety for three years, and a high proportion of natural regeneration is killed by this bark beetle. In many cases logged areas quickly become infested with gorse, broom, blackberry or briar, so that early re-establishment is most desirable. *Hylastes* has made this work more difficult and costly. *Sirex* may become a serious pest as it has increased enormously since the gales of 1945. Colonies of *Rhyssa persuasoria* have been liberated periodically since 1937. The gum tree scale (*Eriococcus coriaceus*) which attacks several of the species, and the blue gum gall chalcid (*Rhino-peltella eucalypti*) which confines its activities to *E. globulus* are the two most important insects affecting the eucalypts. Their unhealthy state is, however, due primarily to site and these pests are a secondary factor. Alongside water races the trees are healthy.

Exploitation and Utilisation

Exploitation started in 1914 after the gale of the 10th October of that year had caused widespread damage. The salvage of the blown down timber extended over several years as there was little or no demand for insignis pine timber and only a limited demand for eucalypt and pine as firewood. Since then production of milling

timber, firewood and fencing stakes has gradually increased as plantations reached maturity or suffered wind damage. The following figures show the progress which has been made :—

TABLE II

Period	Sawlogs Ft. b. m.	Firewood Cords	Stakes	Royalty £
1914-30	4,674,130	6,707	138,715	9,540
1931-40	12,939,794	27,923	109,813	18,412
1941-49	39,400,000	14,300	412,000	78,000
Totals	57,013,924	48,930	660,528	105,952

The milling timber was 98% insignis pine, the rest larch, Douglas fir, Corsican pine and eucalypts : the firewood was eucalypts, wattle and pine ; the stakes were eucalypt.

All milling timber was sold on royalty and until 1936 the basis was sawn output. Since then sales have been made on log measure, volume being computed by the "Goss" scale which is in general use in Canterbury. This scale is based on small end diameters, and volume in board feet is obtained by squaring three quarters of the diameter in inches, which gives the contents of a 12ft. log, e.g., a log 12 ft. long and 12 in. in diameter at the small end contains 81 ft. b.m ; a log 16 ft. long and 12 in at the small end contains 108 ft. b.m.

Royalty for insignis pine increased gradually from 1/6 per 100 ft. b.m. in 1914 to 2/6—4/- during the period 1920-35, and from 1936 until the gales in 1945 had risen to 5/- per 100 ft. b.m. The blown down timber was sold for 4/- per 100 ft. b.m., and to-day stands of good quality insignis pine are being sold for 9/- and 10/- per 100 ft. b.m.

On a rotation of 40 years for insignis, yields vary from 55,000 to 80,000 ft. b.m. according to site. All the Board's plantations are situated on the plains, alongside good metalled roads and within 20-50 miles of Christchurch. Access is easy, transport is not difficult, and the returns per acre are high compared with North Island figures.

Logging is by winch, horses or crawler tractor and arch. The Board does not own mills but sells all timber on royalty. The bulk of the firewood is cut on royalty at 15/- per cord for eucalypt and wattle and 10/- for pine not suitable for sawing.

At the present time there are two mills operating entirely on Board timber and six others drawing a proportion of their supplies from the Board's forests. Last year the cut was 10,410,000 ft. b.m. ; this year it will be in the region of 6,000,000 ft. b.m.

Management

The aims of management are to provide shelter on the plains and produce milling timber and other forest produce.

The working plan prepared in 1938 for the period 1938-1958, revised in 1943 and due for revision again now, provides for an area of 17,500 acres of insignis pine and 2,500 acres of Douglas fir by 1983 by annual planting of 430 acres. Until this year the annual planting programme has been achieved. The Board's area is divided into two working circles and four working sections : insignis pine and Douglas fir working circles, and Burnham, Bankside, Hororata, and Darfield working sections. It is planned to have an even distribution of age classes in each section to provide mills located in each with timber in perpetuity.

The planned cut was upset by the gales of 1945 but there is sufficient standing timber available to keep one mill in full production for another six years. Thinnings and privately owned timber will carry it on for a further seven years until the Board's younger age classes reach milling size.

So far 3,200 acres have been purchased out of revenue and planted in trees. It is planned to buy a further 2,200 acres on the plains and 2,300 acres on the downs in order to achieve the objective of the working plan. Land has been bought for £2/5/- to £4/5/- an acre, and suitable land on the downs is worth about £3 an acre. Land acquired on the plains had been grazed but was becoming infested with gorse and from a land-use point of view was better in trees. Six of the original reserves aggregating 307 acres have been sold, but with land purchased the total area under control has increased to 17,780 acres.

Finance

With the increased income over the last four years from plantations which would normally not have been cut for several years, it has been possible to build up reserves to draw upon during the ten years 1955-65. At the 31st March, 1949, investments amounted to £53,497 having risen from £21,908 in 1945.

The following table sets out the probable position during the period 1949-65:—

TABLE III

Period	Royalty	Rents	Interest	Total Revenue	Expenditure	Surplus	Deficit
1949-55	£59,400	£ 7,300	£10,200	£76,900	£54,000	£22,900	
1955-65	£32,000	£11,500	£11,600	£55,100	£100,000		£44,900

It may be necessary to curtail planting for a few years during the period 1955-65 in order to maintain efficiently the existing plantations but this will depend upon economic conditions and the kindness or otherwise of the elements.

Conclusion

The Board is a going concern, giving a public service with revenue derived entirely from its own resources, and receiving neither rates nor subsidies.

At present nine men are employed permanently, and houses are being built in each of the four working sections so that each will have four men as the nucleus of a gang supplemented from time to time with casual labour. In addition, millers and operators cutting firewood on royalty employ about ninety men. Already the Board plays an important part in the economic life of the community, and as its activities expand so will its importance increase. The extensive planting under the present policy should place the Board in an impregnable position by 1983. From then on working from the key belts established now, thousands of acres of light land can be intensively sheltered by gridding the areas with narrow belts. Shelter has played a large part in the economy of Canterbury, for without trees farming on the plains would be largely pastoral. The Board can take some credit for the work that has been done, but the community will always remain indebted to the pioneers who realised how necessary shelter was and made provision for it.

Under the Board's regulations all net revenue is to be used for forestry purposes, but ultimately a stage will be reached when the constituent local bodies should receive a percentage of the net profits and the Board would then become a communal organisation along the lines of those in Europe. This state of affairs, however, is in the very distant future and much remains to be done before the regulations are altered to give the County Councils a share in the revenue.

Summary

The Selwyn Plantation Board controls 17,780 acres of plantation reserves on the Canterbury Plains between the Rakaia and Waimakariri rivers, these reserves were set aside for the purposes as early as 1878. The primary function of the Board is to provide shelter. Forest area has increased from 6,400 acres in 1910 to 12,848 acres in 1948. Insignis pine and Douglas fir are the two main species, and the eucalypt and wattle stands are being converted to insignis pine.

The Board is not a rating authority and its revenue is derived from its own resources, all net revenue being used for forestry purposes. With the exception of a small quantity of firewood and fencing stakes, all forest produce is sold on royalty.

The working plan provides for a forest area of 20,000 acres by 1983 by annual plantings of 430 acres. Revenue will be low during 1955-65, but from then on, if there are no major disasters, income should be sufficient to implement the Board's policy.

Reference

Hutchinson, F. E. A Forest Survey of Canterbury. Unpublished report, Canterbury University College School of Forestry, 1926.