1908.

NEW ZEALAND.

DEPARTMENT OF LANDS:

STATE NURSERIES AND PLANTATIONS

(REPORT ON).

Presented to both Houses of the General Assembly by Command of His Excellency.

SIR,— Department of Lands, Wellington, 22nd June, 1908.

I have the honour to submit herewith the report of the Chief Forester on the State nurseries and plantations under his management for the financial year ended 31st March last, prefacing it with some general remarks on the subject of afforestation in New Zealand, and the lines on which the Forests Branch of this Department has been proceeding up to the present time.

I have, &c.,

WILLIAM C. KENSINGTON,
Under-Secretary for Lands.

The Hon. Robert McNab, Minister of Lands.

GENERAL REMARKS.

IMPORTANCE OF SUBJECT.

From time to time various authorities have called the attention of the Government of the day to the growing need for systematic forest-conservation in New Zealand, notably the late Captain Campbell Walker and Professor Kirk, and in last year's report on "The Timber Industry of New Zealand" extracts were given from articles published abroad showing how the results of deforestation were detrimentally affecting almost every country in the world. In the report it was shown that the matter was becoming one of the gravest nature in many countries, and that the respective Governments were now alive to the evil effect of widespread denudation of hilly and sandy country, and were taking steps to remedy the present state of affairs. It is well known that in France and Germany schools of forestry have for many years been in active operation, and have done an immense amount of good by scientifically studying the methods of tree-cutting and timber-supply generally; and the Governments of the United States and India have also of late years energetically worked to the same end, the results of the Indian Forests Department being particularly noticeable and satisfactory. Although in this Dominion there is not the same pressing need for forest-conservation or afforestation to assist in increasing or producing an annual rainfall, as is so much the case in India and the United States, yet even in this favoured land it is essential to preserve and regulate the present supply and cause it to be distributed in an even and temperate manner; and the further objects of afforestation—viz., to prevent the denudation of hillsides and the preservation of arable soil in the higher regions of the country—are just as imperative in our own country as in the larger and more populated territories to which the articles refer. In considering any scheme for the profitable conservation and partial utilisation of our forest lands, therefore, it has always to be borne in mind that the obtaining of the largest possible quantity of sawn timber from any given area of forest is not the only consideration, but that with a limited supply of timber-trees it behoves us to insure that too rapid a cutting does not take place at the present time, and that a future supply is systematically provided.

INDIAN EXPERIENCES.

The beneficial effects of large tracts of forests on the climate of the country in which they are situated has often been questioned, and a recent publication by the Indian Government throws a very clear light on this vexed and debatable matter. The following extracts are taken from "Notes on the Influence of Forests on the Storage and Regulation of the Water-supply," by Mr. S. Bardley-Wilmot, of the Indian Forest Service:—

"In India instances have occurred where afforestation increased the rainfall of the country to a marked degree, but this advantage, though important, is quite insignificant compared with the effects of forests in storing and regulating the present water-supply and preventing it running to waste. . . . .

"In 1846 Dr. Gibson, then Conservator of Forests, drew attention to the rapid denudation of wooded areas, and to the effect thereby produced in the drying-up of springs and the general falling-off in fertility of the country. . . . .

"In the report of the Indian Famine Commission in 1880 it was also stated that "there is a great amount of evidence from all parts of India showing that the destruction of forests is believed to have acted injuriously by allowing the rain-waters to run off too rapidly. They descend from the hillsides in furious torrents, which carry down the soil, cause landslips, and form sandy deposits in the plains, so that the surface drainage which, if gently and evenly distributed over an absorbent soil protected by vegetation, should furnish a perennial supply of fertilising springs, passes rapidly away, and the streams into which it collects quickly cease to flow, after causing mischief instead of good. So far as any immediate advantage is to be sought from the extension of forest in respect to protection against drought, it will, in our opinion, be mainly in the direction of the judicious inclosure and protection of tracts . . . . from which improved and more certain pasture may be secured for the cattle of the vicinity, a supply of firewood secured which may lead to a more general utilisation of animal manure for agriculture, and a possible addition made to the power of the subsoil to retain its moisture and to the prospect of maintaining the supply of water in the wells. . . . . As to the protection of the higher hill-slopes from denudation, it may confidently be stated that they will, in any case, be more useful if kept clothed with wood than subjected to the wasteful and destructive process by which they are brought under partial and temporary cultivation; and that, whether the expectation of an improved water-supply as a consequence of such protection is fully realised or not, there is on other grounds sufficient reason for arranging for the conservation of such tracts where it is practicable.

"In 1884 Sir D. Brandis wrote, 'Whatever views may be held regarding the effect of forests in regulating the surface drainage and in improving the water-supply, there is no doubt that on hills clothed with forest the soil is protected, that less soil is carried away, and that less sand and silt are carried down by the rivers. There is not a district in the moister regions of India where the effects of denudation in this respect are not visible. The sand which is washed down from the denuded hills in the Hoshiarpur district of the Punjab has destroyed the fertility of large areas, and ravines and torrents are numerous in the more thickly inhabited portions of the Himalaya. In the Nilgiris every year masses of fine silt, which, if retained, might be a source of wealth to the European planter as well as to the native cutivator, are washed down from them into the rivers. The Ratnagiri district, on the western coast south of Bombay, is almost bare up to the crest of the ranges, and the effect of denudation has shown itself by the silting-up of streams which rise in the mountains and run a short course to the sea; some of these rivers were formerly important for the trade of the country, but are now only navigable for small boats. The benefits, direct and indirect, which the people of India will derive from forest-conservancy, if continued in a systematic manner, can hardly be overstated.'

"In 1885–6 Mr. Blanford showed in his annual report on the Central Provinces that prevention of shifting cultivation, followed by fire conservancy, has in ten years increased the rainfall over the affected area by 6·81 in., as recorded at fourteen stations, and in 1887 he reported that 'the general conclusion to be drawn from the facts set forth in the foregoing pages is that, while no instance fulfils the requirements of scientific proof, the tendency of the evidence they afford is uniformly favourable to the idea that the presence of forests increases the rainfall. Firstly, they help to store the water by protecting the soil, and to keep up a constant evaporation; and, secondly, by checking and obstructing the movement of the wind they prevent the evaporated vapour being carried away, and tend to produce that calm state of the atmosphere that is favourable to ascending currents and local precipitation.'

"Next came Dr. Volcher's report on the influence of forests on agriculture, and he stated that 'It has been much debated whether forests and plantations do actually bring about an increase of rainfall or not. But I would point out that their real influence and value consist in their lowering the temperature and thus causing moisture to be deposited where otherwise it would pass on. As a consequence of this, forests and plantations will cause rain to fall in gentle showers instead of heavy and often destructive deluges. Thus, a given quantity of rain will be distributed over a greater number of days, and its value to the agriculturist will be thereby largely increased. The true test of the value of afforestation in this connection is not so much whether the total rainfall be increased, but whether the number of rainy days be more. It has not infrequently been observed that in times of drought there has been plenty of rain in the clouds overhead; what was wanted was some agent to condense and bring it down. Trees would materially aid in performing this. Again, the difference between the action of a gentle rain and that of a heavy deluge is very marked, for while in the former case the water sinks gradually into the soil, in the latter it rapidly runs off the baked surface of the earth, and very often causes damage by the destruction of roads, the washing-away of bridges, and the silting-up of streams. But there are other indirect benefits attending the spread of tree-planting. What trees do is to hold up the soil, preventing it

from being washed away and carried off by streamlets; next, a coating of vegetation soon covers the soil on which trees are growing, and binds it all together, though at the same time rendering it permeable to, and retentive of, moisture, so that the rain no longer flows off as it would over a hard surface without benefiting the soil below. Thus a cool surface is produced in place of an otherwise dry and heated one, on which the sun's rays would impinge directly, and from which they would be reflected; shade and shelter are provided, and in the end a moister climate prevails.' "

The conclusions arrived at by Mr. Eardley-Wilmot after studying the conditions that prevail in all those parts of India which have been the subject of careful investigation are that there is probably at the present time a vast area in India supporting inferior crops, or, perhaps, none at all which could by means of irrigation, if that were available, be brought under forest-growth with certainty and celerity, to the great advantage in every way of the country, and that the systematic spread of afforestation in many localities would tend to protect the water-supply and thereby indirectly afford local security against famine or scarcity.

Afforestation outside New Zealand.

As already stated, this matter is now arousing great attention in all parts of the British Empire and other countries. The Prime Minister of England (Right Hon. H. H. Asquith) on the 19th June was reported to have stated that his Government intend submitting legislation dealing with the subject next session, and it is evident that its importance is recognised by our statesmen.

As a means of comparison between New Zealand's methods and those adopted elsewhere in Australasia, a brief account of the work accomplished in the leading States is appended, and well repays perusal. In next year's report it is hoped to submit a more comprehensive statement of the position in the Southern Hemisphere, so as to show the various views taken of the growing need for reforestation by the different Governments.

Afforestation in Australia.

New South Wales.—The Under-Secretary of Lands, Sydney, states that his Government has not yet entered upon systematic planting-work, and is unable to furnish information based on any extensive practical experience.

South Australia.—The Conservator of Forests, Woods, and Forests Department, Adelaide, reports that forest operations were commenced in this State in 1876 under a Forest Board, and subsequently the Department of Woods and Forests was established in 1882, with a Conservator of Forests at its head. It possesses a permanent staff, consisting of five foresters, five nurserymen, seven foremen, and sixteen general labourers, with extra labour as needed during planting time.

The area of forest reserves on the 30th June, 1907, was 164,113 acres, and the number of nurseries for rearing the stock was seven, while the total area of plantation satisfactorily established and actually valued was 7,047 acres.

The main objects of the Department have been—

(*a.*) The proper utilisation of the mature timber and the conservation of the younger growing trees in the reserves.

(*b.*) The issue of trees gratis to encourage tree-planting for ornamental and shelter purposes.

(*c.*) The provision of various timbers for future use.

With reference to the above, it may be stated—

(*a.*) Considerable numbers of sleepers have been obtained (as well as posts and rails) as long as matured timbers were available from red-gum (*Eucalyptus rostrata*), blue-gum (*E. leucoxylon*), box-gum (*E. hemipholia*), and sugar-gum (*E. corynocalyx*), and young trees of these species are now steadily developing over a moderate area as a result of careful conservation in the different reserves.

(*b.*) During the twenty-six years in which the distribution of trees "gratis" has been carried out 6,988,909 trees have been given away to farmers and other settlers for beautifying their homes and providing shelter for both their stock and crops.

(*c.*) Various gums have been planted in the different plantations, and exotics (principally pines) have been experimented with to test their suitability for our climatic and soil conditions.

All things considered, the pine giving most satisfactory results is the Remarkable or Monterey pine of California (*Pinus insignis*). From timber obtained from trees of this kind of twenty to twenty-five years old fruit-cases of various kinds—principally apple export, raisin, and apricot—have been made to the number of 41,121, realising a gross return of £1,278, and leaving a satisfactory margin for revenue after deducting all costs to the Department.

From other timber large quantities of rails, posts, and firewood, and other useful material, have been obtained from time to time as thinnings, but the main crop of timber has not yet matured.

In a report on "Deforestation in South Australia," Mr. W. Gill, F.L.S., the Conservator of Forests, gave very cogent reasons in favour of a systematic scheme of replanting, and in the course of a lengthy exposition on the subject stated amongst other principles that "the whole output of a forest should be regulated on the universally accepted principle among foresters that the forest as a whole constitutes the capital, and that only so much timber should be cut annually as is equivalent to the annual increase in growth made by the timber—that is to say, that the interest only should be taken and the capital left untouched. . . . . The grazing of forest land acts both directly and indirectly in denuding the country of timber. Many trees in their seedling stages made excellent fodder, of which stock are not slow to avail themselves, and so direct and extensive is the damage done in this way that in some countries some species of shrubs and trees have totally

disappeared owing to the incessant grazing by goats—probably the greatest curse to young trees in existence. . . . . The clearing and grubbing of land for agriculture has caused the deforestation of considerable tracts of country. Where this clearing has been limited to plain lands and the upland of gentler grade no objection can be raised, except as regards the great want of judgment too often shown in failing to leave broad belts of timber for shelter against winds and clumps of trees for a protection for stock. The total clearance of all timber without regard to this very important consideration in many places has added largely to the trying and blighting effects of both hot and cold winds, and the clearing of the steeper hillsides for agriculture has produced very unsatisfactory results in many ways."

Necessity for Afforestation.

Although the needs of the great Indian Empire are infinitely more urgent and widespread than those of this Dominion can ever be, yet in proportion it may be urged that the general principles underlying the modern system of forest-conservation and reforestation in all countries apply equally to New Zealand as to the older civilisations. The more this subject is studied, the more one is impressed with the fact that judicious afforestation is the backbone of success in the important industries of every nation. As has been frequently pointed out, the cutting and utilisation of the indigenous forests by the sawmillers is proceeding at such a rapid rate in New Zealand that it is only the matter of a very few years (comparatively) when the greater bulk of our timber-supply must be obtained from abroad. Each year sees the output larger, and the resources of the Dominion smaller, and, although the Government has taken the matter in hand with commendable foresight by the establishment of State plantations of timber-trees, yet it must be at least from thirty to forty years before any great supply can be calculated on from this source. Under these circumstances it appears imperative to restrict the present indiscriminate sawmilling of all available forests to such moderate extent as will insure their gradual disappearance synchronous with the development and growth of the State plantations, so that as the one fails the other may take its place. Unless some such steps as these are immediately taken, it follows that, although for a few years the demand can be fairly well satisfied, before long there would be no reserve of native timber, and the price would rise to a figure which would seriously embarrass many of the growing industries of New Zealand.

Timber output and Resources.

In last year's report on the timber industry it was shown with what rapid strides the sawmilling industry was increasing, and it may be well to briefly recount them.

The Sawmilling Industry in New Zealand.

Year.	Number of Mills.	Hands employed.	Quantity of Timber sawn per Annum.	Cutting-capacity per Annum.
			Sup. ft.	Sup. ft.
1895	299	4,055	191,053,466	...
1900	334	6,085	261,583,518	...
1905	414	6,912	413,289,742	704,930,600
1907	411	7,139	432,031,611	718,940,000

Estimates of Milling-timber in New Zealand.

Year.	Kauri.	Totara, Rimu, and Kahikatea.	Others.	Total.
	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.
1905	1,112,019,000	28,730,500,000	12,880,431,000	42,723,000,000
1907	646,041,000	22,840,000,000	12,300,000,000	35,786,041,000

Out of the above quantity of approximately 36,000,000,000 superficial feet of milling-timber for the whole of New Zealand, it may be mentioned that no less than 13,445,000,000 superficial feet, or more than one-third, exists in the two land districts of Nelson and Westland, and when it is remembered with what difficulty the timber can be reached, cut, and marketed, it will be seen that the available supply for practical purposes shrinks to a comparatively small amount, as a large quantity of forest, though suitable for milling, is too inaccessible for payable conversion into sawn timber. The present supply of indigenous timber may therefore be reckoned at about fifty years at the existing increasing rate of consumption.

The Timber Industry in New Zealand during 1907–8.

Although no general attempt has been made for the past year to collect data on the above subject, yet, as two of the Commissioners of Crown Lands have furnished details regarding the industry in their districts, they are appended for general information.

Auckland Land District.

The timber industry has been brisk throughout the year, and the demand for kauri has been fully equal to, if not greater than, the supply. Mills with adequate supplies were employed to their utmost capacity, but the growing scarcity and attendant delay in delivering logs renders it impossible for other mills to keep running up to their full power continuously. Large mills originally erected for the sole purpose and utilised exclusively for years for the production of kauri timber are now either partly engaged in cutting mixed timbers (kahikatea and rimu, &c.) or making arrangements to do so. This will prolong the life of such mills, and also tend to extend the time for converting the remaining kauri.

The most notable feature during the year is the increasing use locally of timber other than kauri for general purposes—viz., rimu, totara, matai, kahikatea, &c., supplies of which are obtained coastwise and delivered in logs by scows, the remainder is mostly produced sawn from mills situated from 50 to 108 miles south of the city and delivered by railway, also the introduction into Auckland (the home of kauri) of one or two shipments or part cargoes of Oregon pine (this timber for some purposes is a good substitute for kauri), and owing to the greater remoteness and scarcity of the latter, also the increasing difficulty of obtaining adequate supplies of suitable native-grown timber to meet local requirements, regular importations of Oregon or other pine in increasing quantities must be looked for in the future.

Timber-measurers have been fully employed in preparing timber for sale, thus meeting as far as possible the requirements of sawmillers, who generally make applications for Crown forests or clumps, also remnants or remaining timber in the locality of or adjoining their present bush workings or timber-getting operations.

It is proposed to detail off early this year three parties of two each for measuring timber on the Motatau Block for the Maori Land Board of the Tokerau District.

High prices were realised for the kauri timber offered for sale by public tender during the year, and record prices obtained for three of the lots disposed of in March—viz., 3s. 10½d. for one lot, and 4s. 0½d. per 100 superficial feet for two lots. It is not expected these values will be maintained in the near future, as the former lot was good handy timber, and the successful tenderer for the latter lots was able to utilise his dead-work—roads, dams, booms, &c.—in connection with adjoining sections and other workings in the locality.

Various kinds of timber, aggregating 55,614,536 superficial feet, as under, were disposed of during the year; value, £44,875. Royalty received, £41,604, being an increase of £6,975 over previous years.

—	Kauri.	Rimu.	Kahikatea.	Totara.	Matai.	Miscellaneous.	Total.	Value.			Royalty received.		
	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.	Sup. ft.	£	s.	d.	£	s.	d.
Crown lands ..	30,589,895	5,609,395	5,193,088	1,224,101	10,943	16,439	42,643,861	29,826	6	8	27,370	3	2
State forests ..	10,207,472	2,127,783	380,081	248,465	6,874	..	12,970,675	15,049	1	9	14,234	14	2
	40,797,367	7,937,178	5,573,169	1,472,566	17,817	16,439	55,614,536	44,875	8	5	41,604	17	4

In addition to the above, the following timber was measured and disposed of for the Education Department.

Education reserves	1,103,009	7,503	14,112	16,012	1,888	..	1,142,624	1,176	14	1	..

Export of Timber, December, 1906, to December, 1907.—From Kaipara, 32,616,266 superficial feet, value £128,487; from Auckland and other ports, 30,400,512 superficial feet, value £147,923: totals, 63,016,778 superficial feet, value £276,410, being a decrease in quantity of 5,271,940 superficial feet and £1 in value as compared with similar periods for previous year. (The disparity between quantity and values is owing to the increased price of kauri.) Of the total exports it is estimated that about 45,000,000 ft. is kauri, and the remainder mostly kahikatea.

Timber-floatage.—Forty-six new licenses were issued and thirty-three renewals were granted during the year. In the past many timber-dealers, sawmillers, and others engaged in the timber industry neglected to take out licenses. This neglect also extended to lack of control of the logs after they were placed in the water—so much so that in some cases they were allowed to drift about or sink—if the former, to be picked up at the convenience of the owners, rafters, or others; if the latter, to have the ownership or liability disclaimed—until the abuse became so grave and complaints so numerous of the damage sustained or impending by local bodies and others, whilst there was a continuous danger to small craft, launches, boats, &c., besides difficulty and delay experienced by settlers in reaching their homes owing to sunken and derelict logs and other obstructions impeding navigation, that the Marine authorities found it expedient to cause sunken logs to be recovered at the expense of the owners, and this Department took action against all known offenders, as the abuse became acute, owing to the increasing quantity of kahikatea, rimu, and other timbers (less buoyant that kauri) being utilised for milling purposes rendering such action necessary.

Bush-fires.—Owing to the unusually dry summer, bush-fires covering large areas were prevalent throughout the province. With the exception of two small reserves, the undisposed-of portions of Crown forest containing kauri escaped injury, although the fires approached the boundaries of Omahutu, Puketi, and Waipoua State Forests. In a few instances fires passed over old kauri workings and other areas containing mixed timbers, scorching the standing trees. On the whole the loss sustained by the Crown through the fires in Crown forests this year is inappreciable. On the other

hand, private owners in various districts suffered more or less severely through damage to standing bush, logs, dams, tramways, buildings, roads, camps, &c. Where opportunity occurred, the timber-measurers, caretakers, bush contractors with their employees, and others assisted to stay the ravages and also the spreading of fires.

Gathering Gum, Waipoua and Warawara State Forests.—A small contract to strip and grade tree-gum in Waipoua has been let recently. Large returns are not expected, as incisions are restricted. About 8½ tons of tree-gum has been received from Warawara State Forest, 6 tons of which has been gathered by contract, and the remainder by the caretaker, part of whose time is utilised for this purpose. The object in stripping the gum is to remove the temptation for trespassing, and the practice is to gather the overflow outside of incisions only with a view to the preservation of the trees.

MARLBOROUGH LAND DISTRICT.

Schedule showing Approximate Quantity of Milling Timber.

Rimu.	Kahikatea.	Matai.	Totara.	Birches.	Totals.
		On Crown Lands.			
68,000,000	23,000,000	5,900,000	350,000	5,000,000	102,250,000
		On Privately-owned Lands.			
54,000,000	14,600,000	2,600,000	197,000	4,000,000	75,397,000

These quantities are, of course, only rough estimates of the amount of timber still available. Much of this may be destroyed by fire before it can be utilised; on the other hand, as timber becomes scarcer and more valuable new ways of working may be devised, and timber now considered inaccessible may be used and a considerable greater quantity produced.

The quantities of the several varieties of timber cut from the State Forests in this district are as follow: Rimu, 1,491,704; white pine, 475,748; totara, 30,719; and matai, 176,484 super. feet; or a total of 2,174,655 super. feet, yielding a total revenue in royalties of £590 15s. 4d.; an increase of £14 2s. 5d. over last year's receipts, but a decrease of 142,342 super. feet. This apparent anomaly is caused by a variation in the quantities of the higher-grade timber, some of which pay 1s. per 100 super. feet and others only 6d.

The quantity of timber cut from Crown lands this year has been 4,520,132 super. feet, made up as follows: Rimu, 2,486,828; kahikatea, 1,468,802; totara, 83,865; and matai, 480,637 super. feet—an increase of 1,725,910 super. feet. The total royalties from this source has been £1,192 17s. 1d., showing an increase of £593 18s. 1d. on the previous year. This is largely due to Messrs. Brownlee and Co.'s new mill at Ronga cutting for part of the period.

The gross revenue derived from all classes of State-owned forests has been £1,783 12s. 5d., or an increase of £608 0s. 3d. over last year's receipts; but out of this sum £596 8s. 6d. is payable to local bodies.

Estimated Receipts for next Year.—Owing to the starting of the double mill in the Upper Opouri Valley it is estimated that the gross revenue will be £2,300.

The approximate quantity of timber cut from bush owned by Europeans—or privately owned land—is estimated to be about 3,800,000 super. feet, divided very much into the same proportions as to varieties as the timber cut from State-owned forest. It is difficult to give a close approximation under this head, because private mills do not appear to keep any close account of the timber they cut.

The approximate quantity of timber cut in this district from all sources is about 10,494,000 super. feet, about 4,864,000 super. feet of which is exported to Nelson, Wellington, and Lyttelton. The balance of 5,630,000 super. feet is used locally, chiefly for building purposes, cabinet-work, box-making, &c.

The total number of men employed directly by the mills is 247, but there are probably about twenty or thirty men engaged in carting and other things connected with the industry.

There are fourteen mills now cutting in this district—the same as last year; some have closed down, cut out, or have shifted to new localities.

NELSON LAND DISTRICT.

There are eighty sawmills in the Nelson Land District, an increase of eight mills during the past year. Twenty-three of the mills are situated in the Buller County, fifteen in Inangahua County, and the remainder—forty-two—in the northern portion of the district. The cutting-capacity of the mills is 69,700,000 superficial feet. Fourteen of the mills are worked by water generating 145-h.p., and sixty-six by steam generating 765-h.p. Fifty-nine mills supply timber for local purposes, twelve for purposes of export to other districts and local purposes, and nine for export to other districts only. Twenty-four of the mills are cutting timber off Crown lands, forty-eight off lands held by Europeans, and eight off Westport Harbour Board endowment lands. The output for the year from the sawmills is as follows: Rimu, 12,047,358 super. feet; kahikatea, 2,220,565 super. feet; matai, 540,000 super. feet; birch, 925,747 super. feet; totara, 155,000 super. feet; yellow pine, 742,617 super. feet; cedar, 400 super. feet: total, 16,631,687 super. feet—an increase of 37,288 super. feet for the year. Number of persons employed in connection with the sawmilling industry is 493; number of horses and bullocks, 302 and 123 respectively; number of miles of tramway in use, 81 miles.

Little improvement has taken place in the timber industry in the northern portion of the Nelson District, or in the Inangahua County, during the year. In the Buller County, however, an improvement is noticeable. In northern Nelson the mills are of small capacity, and the scarcity of timber does not warrant expenditure in re-establishing plants with modern equipment.

Recent bush fires have hastened the extinction of the industry in this portion of the district, about 600 acres of good milling forest on private property and 2,000 acres of State forest having been destroyed.

In Buller County the majority of the mills are working continuously, and large quantities of timber are exported therefrom to other districts of the Dominion, especially from Karamea. Nearly all the mills in this county cut timber off Crown lands, royalty being paid at schedule rates. An important consideration in relation to the Crown forests in Buller County is the preservation of areas for mining purposes. The expansion of the coal-mining industry in this portion of the Dominion has induced the Land Board to preserve areas of forest for the supply of timber to the mines.

The revenue derived from royalty on timber in this district during the year was £2,850, and, taking last year's revenue for comparison, Nelson District stands third in value of importance in the Dominion in respect to the milling industry, Auckland and Westland taking precedence.

Uses to which the different kinds of Trees grown in the State Plantations may be put.

The accompanying table gives an interesting description of the uses to which the timber of the trees now being grown in the State nurseries and plantations may eventually be put. It will be noticed that the number of trees shown as planted—viz., 18,300,779—does not agree with the numbers given in the report of Mr. Matthews for the past year; but this is accounted for by the fact that the return was made up during last year, and the totals therein given are those growing on the 31st March, 1907, not 1908.

Name of Tree.	Number planted.	Uses for which the different kinds of Trees are suitable.
Acacia melanoxylon ..	45,435	Furniture, shop-fittings, pianos, railway purposes, billiard-tables, &c.
Acer saccharum	3,625	Furniture, shoe-lasts, flooring, and general purposes (sap is made into sugar).
,, pseudo-platanus ..	485,211	Turnery, furniture, boxes, dairy utensils, blocks and pulleys.
Æsculus hippocastanum ..	2,232	Cabinetmaking, sides and bottoms of carts, general turnery.
Alnus gultinosa	67,518	Barrel-staves, boxes, general purposes under ground or under water.
Betula alba	210,540	Cabinetmaking, turnery, barrel-staves, crates, brooms, &c.
Castanea sativa	15,911	Furniture, flooring, interior work, posts, rails, &c.
Catalpa speciosa	222,575	Furniture, posts, sleepers, and telephone-poles.
Cupressus Lawsoniana ..	23,700	Flooring, sleepers, fencing, and general lumber.
Eucalypti (species) ..	2,196,544	Used generally for all constructive works where durability is essential; also for sleepers, posts, wheels, and other purposes where strength is required, telegraph-poles.
Fraxinus Americana ..	1,775	Boat-oars, cabinetmaking, coachbuilding, agricultural implements, tool-handles, &c.
,, excelsior ..	578,175	Ditto.
Juglans cineria	2,651	Chiefly furniture and pianos, gun-stocks, billiard-tables, clocks, &c.
,, nigra	4,952	Ditto.
,, regia	61,424	,,
Knightia excelsa	200	Furniture.
Larix Europæa	5,275,460	Railway-sleepers, posts, boat and bridge building, pit-props, and general farm purposes.
,, leptolepsis	2,850	Ditto.
Picea excelsa	1,165,998	General constructive purposes, flooring, scaffolding, masts, spars, packing-cases, casks, pit-props, wood-pulp, &c.
,, sitchensis	153,993	Ditto.
,, Canadensis	1,400	,,
Pinus Austriaca	3,085,926	Used generally for all constructive purposes both inside and outside buildings, packing-cases, butter-boxes, shelving, pattern-making, posts, sleepers, &c.
,, Canariensis ..	1,025	Ditto.
,, contorta	1,090	,,
,, coulterii	605	,,
,, densiflora	2,325	,,
,, excelsa	100	,,
,, halapensis	66,575	,,
,, Jeffreyii	3,693	,,
,, Lambertiana ..	1,250	,,

Name of Tree.	Number planted.	Uses for which the different kinds of Trees are suitable.
Pinus Laricio	677,900	Used generally for all constructive purposes both inside and outside buildings, packing-cases, butter-boxes, shelving, pattern-making, posts, sleepers, &c.
,, muricata	109,070	Ditto.
,, ponderosa	435,000	,,
,, Benthamiana ..	117,050	,,
,, pinaster	11,425	,,
,, radiata	110,161	,,
,, rigida	9,325	,,
,, sabiniana	25	,,
,, silvestris	200	,,
,, strobus	108,625	,,
,, thumbergii	700	,,
,, Torreyana	1,820	,,
,, tæda	1,100	,,
Platanus orientalis ..	3,900	Furniture, box-making, turnery, pulleys, and pattern-making.
Podocarpus dacrydioides ..	550	Butter-boxes and packing-cases.
,, totara ..	181,100	Telegraph-poles, sleepers, joinery, plates, and all purposes where durability is required.
,, Hallii ..	200	Ditto.
Poplars (var.)	14,500	Packing-cases, sides and bottoms of drays, furniture-frames and interior work.
Pseudo-tsuga taxifolia ..	419,972	Beams, general lumber, scaffolding, and all constructive works.
Pyrus aucuparia	32,033	Cabinetmaking, furniture, turnery, carving, &c.
Quercus pedunculata ..	2,031,671	House and ship building, wagons, carriages, casks, &c.
,, suber	1,124	Produces the cork of commerce.
Robinia pseudo-acacia ..	161,800	Posts, axe and pick handles, and general farm purposes.
Salix (var.)	13,663	Cricket-bats, barrow and dray bottoms, knifeboards, bread-platters.
Sequoia sempervirens ..	41,841	Venetian blinds, general carpentry and joinery work.
Sophora tetraptera ..	7,875	Posts, rake-teeth, dowells, and bent work, and general joinery and interior finishing.
Thuja gigantea	13,975	General joinery-work and interior finishing.
Ulmus campestris	775	Coffins, coachbuilding, furniture, packing-cases, &c.
Corylus avellana	1,310	
Ornamental shrubs ..	68,655	
Leguminous plants ..	37,676	
Total	18,300,779	

Reasons for Forest-conservation.

Although New Zealand by reason of its physical configuration and extensive ranges of mountains is fairly secure from any universal or long-continued drought, such as is periodically experienced in many parts of Australia and other countries, yet the question of forest-conservation and afforestation is nevertheless as important here as anywhere else in the world. The reasons for this may be briefly summed up as follows:—

(a.) Industrial.—The necessity for producing enough millable timber to meet the continuous and growing requirements of the building and allied trades, which would otherwise be driven to foreign markets and compelled to purchase timber at whatever rates may be imposed abroad.

(b.) Climatic.—The great need of exercising care that a too-rapid destruction of the present forest-areas, which are vastly smaller than those which clothed the islands when first colonised by Europeans, does not injuriously affect the annual rainfall in volume and extent, and reduce the present water-holding power of the land.

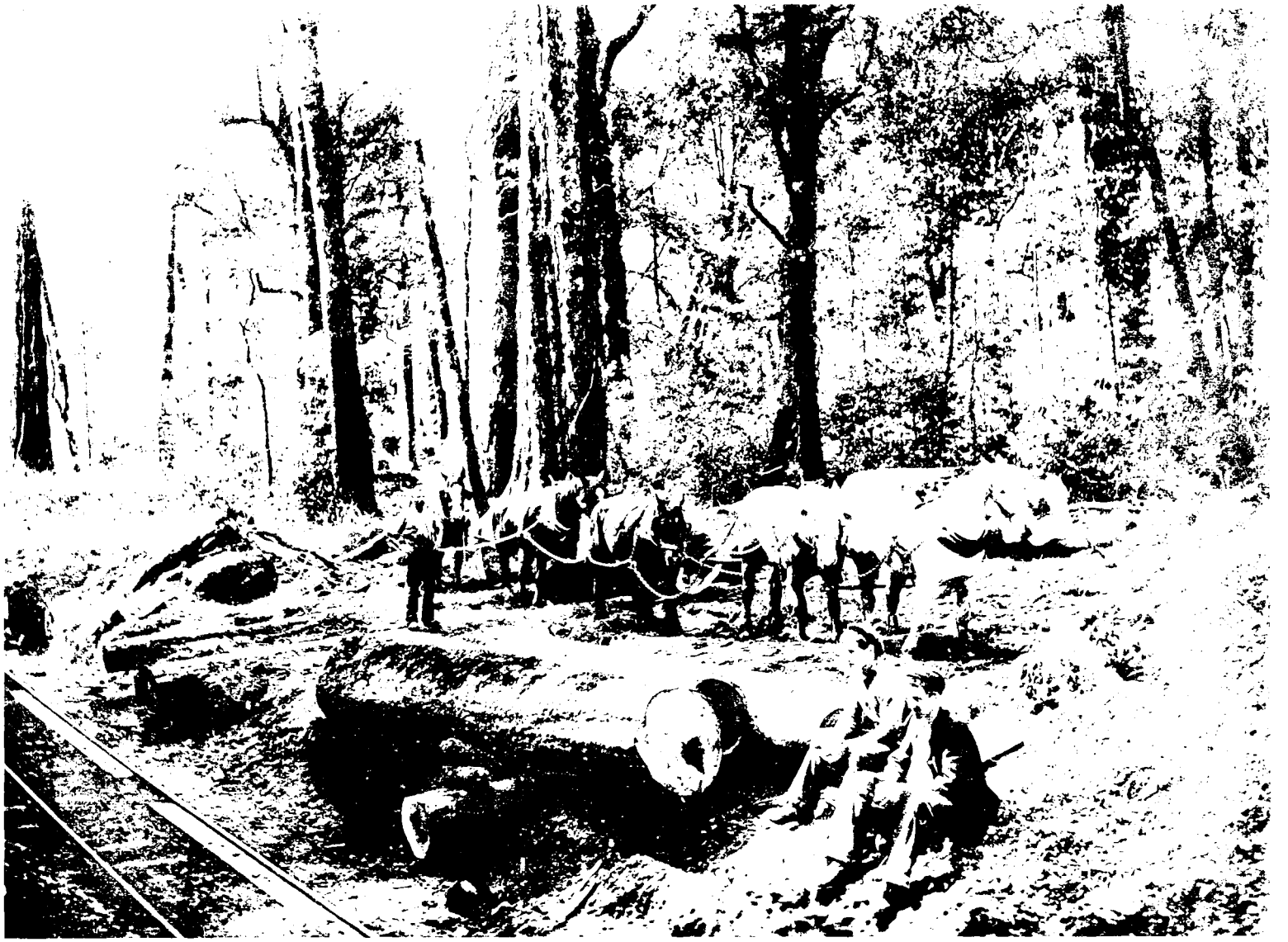
(c.) Prevention of Soil-denudation.—The retention of the forest-covering on steep slopes and other land liable to erosion, so as to prevent slips thereon and soil in the vicinity, that with care and adequate protection would yield satisfactory returns of produce, being carried away by fierce downpours of rain into the adjacent streams, assisting to choke them up and thereby causing floods and damage to the lower-lying lands of the district.

Efforts of the Government.

From an early stage the Governments of the day have in some measure endeavoured to preserve the native forests wherever it was deemed advisable to do so, and under the various Land Acts in force large areas of forest land have been permanently reserved for the growth and preservation of forests. In addition, several Forest-tree Planting and Encouragement Acts were passed by the Legislature with a view to aiding private landowners to plant waste land. These

I. Brownlee's Sawmill, Pelorus Sound.

(*W. H. Macey, photo.*



2. Sawmilling in the Marlborough Bush

efforts were subsequently assisted by the enactment of "The New Zealand State Forests Act, 1885," which set aside large areas of Crown land as State forests, and provided for the establishment of schools of forestry and agriculture. Despite these attempts to conserve sufficient timber for the country's requirements, it was recognised that the annual diminution was too great to be met in any other way than the establishment of new plantations of timber-trees to counteract the continual shrinkage, and plantations were started in the Kaingaroa Plains (between Taupo and Rotorua) and in the Otago District under the supervision of the local Commissioners of Crown Lands and their staffs. As it was found necessary to engage a special officer to control the nurseries required in connection with reforestation, Mr. H. J. Matthews was in 1896 appointed to this position, and has been in charge of the nurseries and plantations since that date, whilst the Commissioners of Crown Lands act as Conservators for the State Forests, and the officers of the Department of Lands who fill the positions of timber experts and Crown Lands Rangers work under the Commissioners and help to safeguard and periodically inspect the forests. In this way the subject of forest-conservation and afforestation has been carefully studied, and the special requirements of the Dominion met as far as practicable.

Establishment of Nurseries.

The first nursery started was at Eweburn (Otago), and since then another at Tapanui (Otago), the great nursery at Rotorua, and a smaller one at Ruatangata, near Whangarei (Auckland), Hanmer Springs (Canterbury), and Starborough (Marlborough), have been established, and plantations made in as convenient vicinity to these nurseries as possible. Being all established in treeless localities, their effect is twofold, as they not only build up a supply of timber-trees in places where at present they are unobtainable, but their influence on the local climatic conditions will be watched with great interest, though it is, of course, obviously absurd to expect the slightest change in meteorological conditions until the plantations are of a very large size and well grown, which cannot be the case for some twenty or thirty years to come. It has been the aim of the Department to grow trees not only thoroughly suitable for the requirements of the carpentering trade, &c., but also of a fairly quick growth, as by the details previously given it will be seen that in some thirty or forty years' time New Zealand will have used up nearly all the available forests within reasonable access of the centres of population, and will then be probably relying on foreign markets.

In the various nurseries and plantations under the control of the Department the most careful experiments have been carried out with a view to seeing which are the most suitable trees for our purposes, and, as funds permitted and circumstances warranted it, the annual planting has been gradually increased. During the year ended 31st March, 1907, an area of 1,992 acres was panted with a little over five million trees, and for the last year a further area of 2,655 acres was planted with six and a half million trees, whilst the total area planted to date amounts to 9,465 acres, on which it is estimated there are nearly twenty-two million trees.

Future Requirements.

These, however, will not all be available in the years to come, as it must be remembered that they will need very extensive thinning and trimming to enable a satisfactory crop of timber to result. In fact, it is probable that out of the five or six million trees planted annually at the present time no more than a third will eventually survive the repeated thinning processes and reach maturity. Moreover, long before they reach an age at which the best results can be expected, the scarcity of timber in New Zealand is likely to be such that there will be a general demand for the utilisation of the trees for immediate use so soon as they are in any way suitable for the requirements of our trades. Bearing in mind, therefore, only the industrial requirements of the Dominion, the present rate of planting is only barely sufficient for our future needs, and, although the greatest efforts are made to plant trees which will yield the best results in the shortest space of time, there are very few trees fit for milling under forty or fifty years, and even these will be much more profitable if allowed to remain in the ground another ten or twenty years. Planting for posterity, though admirable in theory, is inevitably attended by pressing and irresistible drawbacks in practice, and all that can be done is to harmonize the needs of the present day as far as practicable with the requirements of future generations. It is almost impossible to lay too great stress upon the importance of the work of reforestation in this country, and each year sees its importance in other lands more and more recognised by far-sighted statesmen, and greater efforts made to insure the permanent timber-supply of the nation.

Production of Artificial Forests.

Although there is a vast disproportion between the areas annually cut down in our native forests for sawmilling purposes and the areas planted by the Forestry Branch, yet it may be well to point out that an average acre of milling-bush contains a large number of trees unsuitable for sawmilling, and probably only from 10,000 to 20,000 superficial feet of timber is eventually extracted from the area. On the other hand, in our plantations, by successive thinnings, only the best specimens are allowed to remain, and, if a systematic supervision is exercised in the future, the final result will be the production of perhaps six hundred suitable milling-trees, which in forty years' time will each contain on an average 1,000 superficial feet of timber, so that the artificial forest will yield no less than 600,000 superficial feet of timber against the indigenous forest's return of from 10,000 to 20,000 superficial feet. In this comparison no account is taken of the kauri forest, which gives an exceptional yield, for, as the kauri is rapidly disappearing and only forms a small proportion of our native forests, its comparison would be somewhat misleading.

Revenue and Expenditure.

Up to the present time the expenditure and requirements of the State nurseries and plantations has been met by the revenue derived from the sale of timber in State forests, and of these the kauri forests in the Auckland District have contributed most of the receipts. Owing to the rapid disappearance of the kauri, the State forest revenue is quickly shrinking, and it is no longer possible to maintain and develop the tree-planting operations of the Department from this source. It will consequently be necessary to draw on the Consolidated Fund for future requirements, and, although generations to come will reap a rich return from present expenditure, yet forestry operations must of necessity be unremunerative for a considerable period, though a small revenue may be derived from our plantations by the sale of "thinnings" and surplus tree-plants from time to time, and the sale of timber in State forests will still enable a portion of the required revenue to be provided for many years to come.

Conservation of "Worked-out" Areas.

With reference to the kauri forests, it may be well to mention the rule adopted when the millable timber is taken out. The greatest care is taken that no unnecessary damage is caused to the remaining trees in the forest by sawmilling operations, and as soon as the kauri has been extracted the remaining forest is protected from any further destruction and, as far as possible, allowed to reproduce itself, so that for climatic and soil-denudation purposes the land is as adequately conserved as before the kauri had been taken out. In several cases it has been found that a remarkably brief period has been sufficient to enable young growth to spring up and obliterate the ravages wrought by milling operations. Not only in the above-mentioned forests, but also in those of the Nelson, Westland, and Southland Districts, this has been found to be the case, and the officers of the Department have always received strict instructions to endeavour to insure that the millers leave untouched, as far as practicable, the non-milling trees in the forest. From even a close view it is difficult to discover after the lapse of a few years whether many of our native forests have been the subject of sawmilling operations, and the climatic effect is retained in an admirable manner.

Best Localities for Afforestation.

Experiments have been made to see whether it is possible to replace the gaps in the forests caused by sawmilling operations with the planting of foreign trees ultimately suitable for milling, but it is found that such a matter would be very expensive and the results hardly worth the time expended, as the rapid growth of native scrub and young trees would retard the development of exotic plants. It is therefore proposed to continue to devote the whole of the efforts of the afforestation branch to raising forest plantations in treeless localities, where land is in the hands of the Crown, and is almost wholly unfitted for agricultural or grazing purposes. Such tracts are found in the vast Kaingaroa Plains, between Rotorua and Taupo, where some 600,000 acres of Crown land are available for planting purposes, and the Waimarino Plains, to the west of Tongariro (in the North Island), which, now that the railway has been completed, can readily be supplied with plants from the central nursery at Rotorua; whilst in the South Island the chief localities needing attention are South Marlborough and North Canterbury, which can be supplied with trees from the Hanmer Springs Nursery, and South Canterbury and parts of Otago, which can be supplied from Tapanui Nursery. By acting in this manner, expenditure is lessened and forests will gradually grow in localities where they are needed for climatic purposes, and from which they can ultimately be worked at a profit owing to their easy access to the principal markets of New Zealand. In a few cases, however, it has been noticed that the unusual dryness of certain areas prevents any successful attempt at afforestation being undertaken at the present time, and consequently care has been taken to avoid all such localities in future operations.

Duties of Forestry Branch.

As has been stated, there are two distinct divisions of the Forests Branch of this Department. The older or *forest-conservation* division is that whose duty it is to care for, inspect, and deal with our remaining indigenous forests. These include (*a*) Crown forests reserved under the Land Acts, administered under the personal direction of the Minister of Lands through the local Commissioners of Crown Lands and their staffs of timber experts, Crown Lands Rangers, &c.; and (*b*) State forests reserved under "The New Zealand State Forests Act, 1885," dealt with by the Commissioner of State Forests (*i.e.*, the Minister of Lands) and Conservators of State Forests (otherwise known as Commissioners of Crown Lands) under special regulations. It may be necessary later on to appoint a special officer to supervise the cutting and milling operations in these forests somewhat after the scheme adopted in the Indian Empire, and in France and Germany, &c., where only systematic and limited cutting is sanctioned under rigid safeguards for the protection of all trees not authorised to be felled. But at the present time the system of preliminary inspection by special officers, public notification of the sale of certain specific areas of bush, and careful supervision of the milling operations, is considered to be sufficient for our requirements, and a more elaborate system of dealing with our forests may not be needed for some time to come. The second or *afforestation* division is under the charge of a superintendent of forest nurseries and plantations (designated for departmental purposes as "the Chief Forester"), assisted by a staff of assistant foresters and nurserymen, and its results are embodied in the following report.

REPORT BY CHIEF FORESTER.

To the Under-Secretary for Lands.

I HAVE the honour to submit the twelfth annual report on State nurseries and plantations for the year ending 31st March, 1908.

During the year 10,389,162 seedling trees have been raised in six nurseries, 6,440,785 trees have been planted permanently at nine plantations, covering an area of 2,655 acres, bringing the total planted area to 9,465 acres, on which are at present growing 20,803,083 trees from two to ten years old.

The nurseries contain 17,904,510 trees varying in age from one to three years, representing a value of £27,614 5s. 10d. The output of trees from seven nurseries for twelve months amounts to 7,630,122, valued at £15,722 14s. 6d., whilst the total output of trees from nurseries since their initiation is 34,993,625, of a value of £78,793 4s. 5d.

The expenditure on nurseries for the year amounts to £11,109 2s. 2d, thus showing a credit balance of £4,613 12s. 4d.

The total expenditure on nurseries and plantations for the year is £24,442 15s. 1d., and the expenditure to date £138,122 15s. 5d. Against this outlay improvements at the nurseries, and trees grown to date represent a sum of £113,407 1s. 3d.

Planting operations for the year have been successful in the districts of Papanui, Hanmer Springs, Rotorua, and Whangarei; but the results at Gimmerburn, in Central Otago, and Dumgree, in southern Marlborough, were practically failures owing to long-continued drought, which not only caused the loss of the greater portion of the newly planted trees, but resulted in the deaths of most of the established trees from two to five years planted. One notable exception, which appears to flourish under the most adverse conditions and in the poorest of soils, is *Pinus ponderosa*.

Planting operations have been so disappointing at the two stations named that it has now been decided to abandon further work at Dumgree, and to limit operations at Gimmerburn to the filling-up of the present enclosed area. Tree-planting will, however, be still continued in the Maniototo district, but the locality will be in the vicinity of Naseby, where the Department have fully demonstrated (as the result of some eleven years' experience) that certain classes of trees can be grown with entire success. The species found to withstand the trying climatic conditions best are *Pinus ponderosa*, *P. Benthamiana*, and *Larix europæa*, the latter species flourishing luxuriantly on slopes with a southern aspect.

Maniototo district again shows the lowest rainfall for the year, with barely 14 in. on ninety-five days, while Kurow Nursery registered 14·43 in. on ninety-four days. Even these meagre rainfalls would have been sufficient to maintain tree-growth, but, unfortunately, they occurred chiefly in the autumn and winter, practically none falling when it was most needed—viz., in the spring and early summer. The maximum rainfall was registered at Puhipuhi, with 110·12 in on 170 days, Ruatangata Nursery being a good second with 85·66 in. on 200 days.

The climatic conditions experienced throughout the Dominion have been unusually trying in extremes, the lowest readings of the thermometer being 14° at Waiotapu Plantation, and 15° at Eweburn Nursery: the highest temperatures being recorded at Kurow with no less than 101°, Hanmer Springs 98°, and Eweburn 96°. Although a wide range of temperature is looked for in the central portions of the South Island—viz., Kurow and Eweburn, both showing a variation of 81°, and Hanmer Springs 80°—it is certainly surprising that 78° difference in temperature has been recorded at Waiotapu Plantation, in the Auckland District. These extreme variations have, of course, a marked effect on plant-life, and it is thus explained why such a few species of trees (out of the thousands available) can be successfully grown at the localities mentioned.

SEEDLING TREES.

Notwithstanding the adverse climatic conditions experienced, the results obtained at the various nurseries have been successful beyond expectation, although the officers in charge had an anxious time during the prolonged drought. Not only has a much larger proportion of seedling trees been raised from a given amount of seeds, but the plants generally are much larger and better-rooted than those of any previous crop.

This success is principally due to the excellent germinative qualities of the tree-seeds obtained, and to a lesser extent to the systematic method of seed-raising adopted at the nurseries, which may be briefly referred to in detail.

(1.) The seed-bed grounds at all stations have now been brought into a high state of cultivation, and are of sufficient area to allow of either a definite rotation of crops with systematic manuring, or to lie fallow for one or two seasons—thus limiting the exhausting tree-crop to one area every third year.

(2.) The adoption of the roller system in sewing and covering the seeds to a defined depth, depending on the class of seeds dealt with.

(3.) The sowing of seeds at the proper time—not at any given date, but depending on the season. In other words, the Nurserymen in Charge have now the necessary experience to enable them to judge at what particular period this work should be undertaken to attain the best results.

(4.) The method of shading and protecting the seed-beds from drying winds and bright sunshine during the critical period of germination by properly constructed seed-frames.

(5.) The judgment of the officers in knowing the exact amount of seed required to a given area, so that the resultant crop will not be too thick to crowd one another, and thus promote conditions favourable to disease, but will allow ample space for further development of each individual

plant, by which means a higher percentage of strong one-year-old plants is grown to a sufficient size for immediate transference to the plantations.

(6.) The care and diligence of the staff generally in attending to every detail connected with the raising of trees, not only during working-hours, but after hours, as well as on Sundays and holidays.

(7.) The experience of the officers in charge in deciding when to water and when to withhold it, even during a period of drought. As this is probably one of the most important details connected with the raising of tree-seeds, a few remarks may not be out of place. Amongst both professional and amateur tree-growers it is a generally accepted axiom that during dry weather the seed-beds should be kept constantly moist by artificial means; but this view is only partially true under exceptional circumstances. When shading of seed-beds is resorted to, it is surprising to find a sufficient amount of moisture just below the surface, even after a prolonged spell of dry weather. On some free open soils with a gravelly or marly subsoil (such as occurs at Hanmer Springs and Ruatangata) a few weeks of drought has a disastrous effect on germinating seedlings, and artificial watering is imperative to save the crops; but at other stations, if the land is in fit condition, the seed-beds can be thoroughly consolidated by rolling prior to sowing, and the effect of this (along with judicious shading) is that ample moisture is conserved to bring the seedlings through the ground without resorting to watering. It is, further, the firm conviction of the officers of the Department that artificial watering frequently does more harm than good, more especially during a prolonged spell of hot dry weather, such as was experienced at all the nurseries during the early summer months.

Selection of Trees limited by Climatic Conditions.

The question is frequently asked, Is the Department raising and planting the best species of trees suitable for the future timber-supply of the Dominion? The answer is partly in the negative and partly in the affirmative, as I will endeavour to explain.

(1.) There are many species of trees which produce excellent timbers that could be grown in the Dominion, but none of our stations are suitable for their best development, chiefly on account of unseasonable frosts. In this class may be mentioned puriri and pohutukawa amongst native trees, and jarrah, sugar-gum, red ironbark, spotted gum, &c., from Australia.

(2.) Another class may be mentioned which comprises most valuable timber-trees, but their slow growth renders them unprofitable from a commercial point of view—kauri, rimu, kahikatea, matai, tanekaha, kawaka, northern manaoa, southern manaoa, silver-pine, yellow-pine, maire species, and many others.

(3.) The third class comprises exotic trees producing various timbers suitable for all technical purposes, but, owing either to the high cost of the seeds, or the uncertainty of procuring annual supplies, their general cultivation is not considered expedient. The common English beech, for instance, is a valuable timber-tree, but there are few trees in the Dominion of sufficient age to produce seeds. The crop is not an annual one (generally every third or fourth year), and all attempts to import it in a sound condition have failed. Other species comprise the English elm, hickory in variety, many of the American oaks, maples, pines, piceas, and abies, seeds of which are either difficult to procure in quantity, do not carry well, or are too expensive for general plantation purposes.

It is confidently asserted that so far as is possible the Department is raising and planting the most suitable classes of timber-trees available for the varied soils and climatic conditions obtaining at the stations at present in operation.

As mentioned in the foregoing remarks on temperature and rainfall, we are restricted to a very narrow limit in our selection, but nevertheless any suggestion or recommendation in regard to this subject will gladly receive every consideration.

Fires.

It is satisfactory to record that very little damage by fire was done to the State plantations during the year, notwithstanding the exceptionally dry summer, when the herbage amongst newly planted trees was in a highly inflammable condition. Some 4 acres of *Podocarpus totara* was destroyed at Puhipuhi owing to the carelessness of an adjoining settler burning off his holding, and a few thousand young eucalypti were also destroyed by fire on Whakarewarewa Plantation, due to the subsoil of some recently cleared land smouldering unseen until fanned into flame by a sudden breeze.

Labour.

The average number of employees during the year was 151·47, against 161·36 for the previous year. Employees generally have done good solid work at all stations, and at a moderate cost. Wages have been increased 6d. to 1s. per day on account of the increased cost of living. Suitable accommodation has been provided for workmen at Puhipuhi, Ruatangata, Hanmer Springs, and Dusky Hill, and similar provisions are in progress at Whakarewarewa and Conical Hills.

Prison Labour.

Thanks to the continued co-operation of the Inspector of Prisons and his officers, I have again pleasure in stating that this system has worked very satisfactorily. The average number of

prisoners employed was 75·07, against 78·90 for the previous year. The average value of work done per man for the year is £79 17s. The Foresters in charge of tree-planting camps are unanimous in their reports as to the excellent work done by the prisoners, the majority of whom take a considerable interest in the various duties assigned them; and, from personal observation during several months of the past year whilst located at prison camps, I confirm this opinion, and assert that with few exceptions the prisoners are obedient, willing, industrious, and careful.

In order to enable well-behaved, industrious prisoners to make a fresh start in life on the expiry of their sentences, a special tree-planting camp has been commenced four miles from the Waiotapu Prison. Here discharged prisoners are offered remunerative employment either at contract rates or at day-wages, and during the few months this camp has been in operation the results have been entirely satisfactory.

A similar system might well be adopted near Hanmer Springs with beneficial results both to the State and to unfortunate men who are discharged from prison frequently without friends and without money.

The whole of the available area reserved for planting purposes at Hanmer Springs having been planted a new block of some 600 acres, situated two miles distant towards Jollie's Pass, was taken in hand. The prison huts and other movable structures were transferred to this site during February. A new cookhouse, mess-room, and store have been erected, an efficient supply of excellent water laid on, and special precautions taken in regard to drainage and other sanitary arrangements. The permanent buildings at the old camp have been altered and renovated for occupation by the Nurseryman in Charge. It is anticipated that sufficient land is available within easy distance of the new camp to keep forty prisoners employed for the next five years.

At Waiotapu arrangements are in progress for the removal of the prison camp to the centre of a new block of some 5,000 acres to the north-east of the present area. The site for the new camp (three miles distant from the old one) is in a most favourable position, with an excellent water-supply available, and every facility for good drainage. When this camp is completed and occupied, a great deal of time will be saved by the men in going to and from their work. It is proposed to plant this new area as far as possible in wedge-shaped blocks radiating from a common centre at the camp. The walking-distance to and from work will thus be evenly distributed for each year's planting.

Convalescent Camp.

In order to provide suitable employment for discharged patients from the sanatorium at Cambridge, it is proposed to establish a movable camp on the Whakarewarewa Plantation, some distance beyond the Waipa Prison Camp. This will to some extent overcome the difficulty with which the medical authorities are now faced in having to discharge convalescent patients who in many cases are compelled to resume their ordinary indoor occupation, thus lessening the possibilities of a complete restoration to health. It is not intended that each patient shall do a certain amount of work or plant a given number of trees, as payment will be made by results on the co-operative system. The State will thus be providing healthy employment for the needy without paying more for the work than it is at present costing by ordinary labour.

Proposals for 1908–9.

Puhipuhi Plantation, North Auckland.—Preparations are in progress for the planting of approximately half a million trees, one-third *Podocarpus totara*, and the remainder eucalypti in various species.

Whakarewarewa Plantation.—It is expected to plant about two million trees here during the ensuing spring, chiefly larch, pines, redwood, Oregon pine, and eucalypti.

Waiotapu Plantation.—Some two and a half million trees have been set aside for this plantation, but the number that will be planted depends on the amount of prison labour available. Larch, redwood, and pines are the principal trees being dealt with. On the completed area of 2,000 acres it will be necessary to place a competent man in charge, to direct pruning operations and general maintenance.

Dumgree Plantation.—Owing to the decision to stop further work here, the available trees at Starborough Nursery—about 700,000—will be transferred to southern plantations. No further trees will be raised at Starborough, which is to be retained meantime as a station for growing horse-feed, &c., for use at the northern nurseries and plantations.

Hanmer Springs Plantation.—Pruning and general maintenance will be attended to on the old area, and about three-quarters of a million trees are expected to be planted on the new plantation, chiefly larch and pines.

Waitaki Plantation, near Kurow.—This plantation and the nursery at Kurow have been closed down, and all movable material distributed among other stations.

Dusky Hill Plantation.—It is expected to complete the planting of the burned area this year, when further work will be confined to general maintenance.

Conical Hills Plantation.—With the trees from Starborough Nursery it is expected to plant about one and a quarter million during the season. About 1,000 acres of planted area will require looking to in the way of pruning. Mr. N. Craig, recently occupying the position of Nurseryman in Charge at Kurow, has been transferred to this station as Forester in charge.

I have to express my thanks to the officers and employees generally for the satisfactory manner in which they have carried out their duties during a very trying season.

The following summaries show the result of the year's operations and present position :—

TABLE A.—SUMMARY OF RESULTS.

Nursery or Plantation.	Number of Trees raised in Nurseries and Plantations, 1907-8.	Number of Trees in Nurseries or Plantations on 31st March, 1908.	Values of Same.	Number of Trees planted, 1907-8.	Area planted in 1907-8.	Total Area planted to 31st March, 1908.
			£ s. d.		A. R. P.	A. R. P.
Eweburn Nursery	542,100	1,105,640	1,757 5 4	..	..	..
Hanmer Springs Nursery ..	1,695,000	2,986,200	4,865 8 6	..	..	..
Kurow Nursery	43,000	43,000	45 3 0	..	..	..
Rotorua Nursery	4,550,000	7,864,700	10,857 9 0	..	..	..
Ruatangata Nursery ..	522,062	761,410	1,715 4 3	..	..	..
Starborough Nursery ..	..	739,600	1,634 16 0	..	..	..
Tapanui Nursery	3,037,000	4,403,960	6,738 19 9	..	..	..
Conical Hills Plantation ..	..	3,313,579	*	370,200	136 0 0	1,082 1 0
Dumgree Plantation ..	..	350,000	*	228,640	84 0 0	469 3 0
Dusky Hill Plantation ..	..	1,276,167	*	475,135	174 2 8	505 2 8
Gimmerburn Plantation ..	..	487,695	*	72,000	26 2 0	173 1 0
Hanmer Springs Plantation ..	..	1,863,170	*	591,400	206 0 0	668 0 0
Kaingaroa Plains Plantation ..	..	44,275	*	..	..	21 0 0
Naseby Plantation	..	360,185	*	..	..	132 2 0
Puhipuhi Plantation ..	..	918,795	*	457,790	425 0 0	1,125 0 0
Raincliff Plantation ..	..	50,000	*	..	..	206 3 0
Ruatangata Plantation ..	..	..	*	..	..	22 0 0
Waiotapu Plantation ..	..	6,932,934	*	2,591,230	952 0 0	2,728 2 0
Waitahuna Plantation ..	..	30,525	*	3,700	1 1 14	12 1 14
Whakarewarewa Plantation ..	..	5,042,126	*	1,650,690	650 2 0	2,319 0 0
Domains, reserves, &c. ..	..	133,632	..	..	..	..
Totals	10,389,162	38,707,593	27,614 5 10	6,440,785	2,655 3 22	9,465 3 22

* Reliable estimates of values not available.

TABLE B.—SUMMARY OF EXPENDITURE AND VALUES.

——	Expenditure for Year ending 31st March, 1908.	Expenditure from September, 1896, to 31st March, 1908.	Value of Trees grown and Improvements in Nurseries, 1907-8.	Value of Trees in Stock and Improvements in Nurseries, from Inception to 31st March, 1908.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Amount at 31st March, 1907	..	..	28,067 16 10	51,992 2 2
Eweburn Nursery	820 16 2	9,538 1 7	2,087 0 10	6,540 2 11
Hanmer Springs Nursery	1,246 15 10	3,923 8 5	5,639 11 8	6,917 13 9
Tapanui Nursery	1,860 9 5	15,245 17 1	7,430 7 4	14,170 6 3
Ruatangata Nursery	1,629 4 4	6,013 6 7	2,494 3 10	4,949 10 7
Rotorua Nursery	3,914 14 7	25,526 19 0	11,556 15 5	18,367 2 5
Starborough Nursery	1,058 1 9	8,689 1 2	3,569 16 7	8,102 14 9
Kurow Nursery	579 0 1	3,070 2 7	340 16 7	2,367 11 5
Conical Hills Plantation	1,403 16 3	9,686 17 11	*	*
Naseby Plantation	241 7 0	2,073 10 5	*	*
Gimmerburn Plantation	415 17 9	2,021 3 2	*	*
Dusky Hill Plantation	1,715 0 4	10,314 9 5	*	*
Raincliff Plantation	..	1,104 12 5	..	..
Hanmer Springs Plantation	1,123 13 4	4,374 4 1	*	*
Dumgree Plantation	1,065 9 11	9,862 7 11	*	*
Whakarewarewa Plantation	3,201 15 4	13,541 13 5	*	*
Waiotapu Plantation	1,547 17 8	5,209 17 3	*	*
Kaingaroa Plains Plantation	11 2 8	368 18 2	*	*
Puhipuhi Plantation	1,685 3 8	4,788 13 4	*	*
Waitaki Plantation	359 6 8	403 14 5	*	*
Waitahuna Plantation	13 15 10	168 10 3	*	*
Domains, Reserves, &c.	..	431 13 1	..	..
Clerical assistance	150 0 0	673 15 0	..	..
Postages and telegrams	42 0 4	60 5 4	..	..
Contingencies: Telephones, stationery, office material, travelling-expenses, and transfer of officers, &c.	357 6 2	1,031 13 5	..	..
Totals	24,442 15 1	138,122 15 5	61,186 9 1	113,407 4 3

* Reliable estimates of values not available.

TABLE C.—OUTPUT OF TREES FROM NURSERIES.

Nursery.	During 1907–8.		Since 1896.	
	Number.	Value.	Number.	Value.
		£ s. d.		£ s. d.
Eweburn	279,125	872 8 6	2,407,327	5,619 6 3
Hanmer Springs	635,180	1,444 10 0	1,571,206	3,889 10 7
Tapanui	741,560	2,214 14 7	9,668,048	24,201 13 10
Rotorua	4,813,367	8,498 15 4	17,801,299	37,009 4 6
Ruatangata	490,790	1,295 11 8	951,795	2,562 18 4
Kurow	110,260	212 15 0	110,260	212 15 0
Starborough	559,840	1,183 19 5	2,483,690	5,297 15 11
Totals	7,630,122	15,722 14 6	34,993,625	78,793 4 5

TABLE D.—MINIMUM AND MAXIMUM READINGS OF THERMOMETER (FAHRENHEIT) AND RAINFALL AT VARIOUS STATIONS FOR THE YEAR.

Station.	Temperature.		Rainfall.	
	Minimum.	Maximum.	Inches.	Number of Days.
	Deg.	Deg.		
Eweburn Nursery	15	96	13·93	95
Tapanui Nursery	24	92	25·91	127
Kurow Nursery	20	101	14·43	94
Hanmer Springs Nursery...	18	98	48·44	116
Starborough Nursery	26	94	17·32	104
Rotorua Nursery	21	92	55·565	139
Ruatangata Nursery	30	82	95·66	200
Waiotapu Plantation	14	92	53·02	117
Puhipuhi Plantation	28	88	110·12	170

TABLE E.—AVERAGE NUMBER OF WORKMEN EMPLOYED DAILY AT THE VARIOUS NURSERIES AND PLANTATIONS DURING THE YEAR 1907–8.

—	Free Labour.	Prison Labour.	—	Free Labour.	Prison Labour.
	No.	No.		No.	No.
Eweburn Nursery ...	5·64	...	Dusky Hill Plantation ...	15·04	...
Tapanui Nursery	13·05	...	Conical Hills Plantation ...	8·05	...
Hanmer Springs Nursery ...	3·09	...	Hanmer Springs Plantation	3·09	10·00
Kurow Nursery	2·16	...	Dumgree Plantation ...	7·70	11·38
Starborough Nursery ...	6·03	...	Whakarewarewa Plantation	23·92	15·05
Rotorua Nursery	32·14	...	Waiotapu Plantation ...	3·29	38·64
Ruatangata Nursery ...	11·00	...	Puhipuhi Plantation ...	11·97	...
Gimmerburn Reserve ...	3·27	...	Waitahuna Plantation ...	1·00	...
Naseby Paddock Plantation	1·03	...		151·47	75·07

H. J. MATTHEWS,
Chief Forester.

The following are the reports from various stations :—

EWEBURN NURSERY, NEAR NASEBY, OTAGO.

(Area, 49 acres; altitude, 1,400 ft.)

The rainfall for the year has again been very slight, the total being 13·93 in., which fell on ninety-five days, the maximum fall being 2·76 in. in December.

The highest reading of the thermometer was 96°, on the 7th and 8th January; and the lowest 15°, on the 29th July and the 5th August. Frost occurred on 145 nights.

Owing to the very dry season, the trees lined out have not made very much growth, but the seedlings have done exceedingly well. The species grown in this district are very few in number, consequent on the extreme climatic conditions prevailing, and, although a very large variety of trees has been experimented with, those entirely suitable for the locality are the species enumerated on schedules attached. The number of trees lined out was 431,700, at an average cost of 2s. 10¾d. per thousand.

The number of trees sent to nurseries and Government plantations was 279,125, their total value being £872 8s. 6d. The number of trees sent out to date amounts to 1,301,687, their total value being £3,862 0s. 11d.

The number of trees in the nursery at the 31st March was 1,105,640, and their value £1,757 5s. 4d.

The details of above will be found on Schedules 1 to 4.

During the year all buildings have been painted, and all tools, implements, &c., have been kept in good repair.

Another foal has been reared during the year, and it is valued at £10.

The average number of hands employed was 5·64.

The following is a record of the rainfall and temperature for the year :—

Month.	Rainfall.	Number of Days Rain fell.	Maximum Temperature.	Date.	Minimum Temperature.	Date.	Number of Days on which Frost occurred.
1907.	Inches.		Degrees.		Degrees.		
April	0·53	3	73	7th	21	29th	7
May	1·03	12	67	1st	16	19th	21
June	0·29	7	55	29th	16	25th	27
July	0·33	6	61	2nd	15	29th	26
August ...	0·97	11	54	30th	15	5th	25
September ...	0·96	10	69	24th	19	16th	18
October ...	0·86	9	79	30th	25	5th	14
November ...	1·89	5	81	5th	29	2nd	3
December ...	2·76	8	88	29th	37	3rd	...
1908.							
January ...	0·53	4	96	17th	32	17th	1
February ...	1·55	7	86	15th	30	1st	1
March ...	2·23	13	76	13th	31	15th	2
Totals ...	13·93	95	...	...	...	...	145

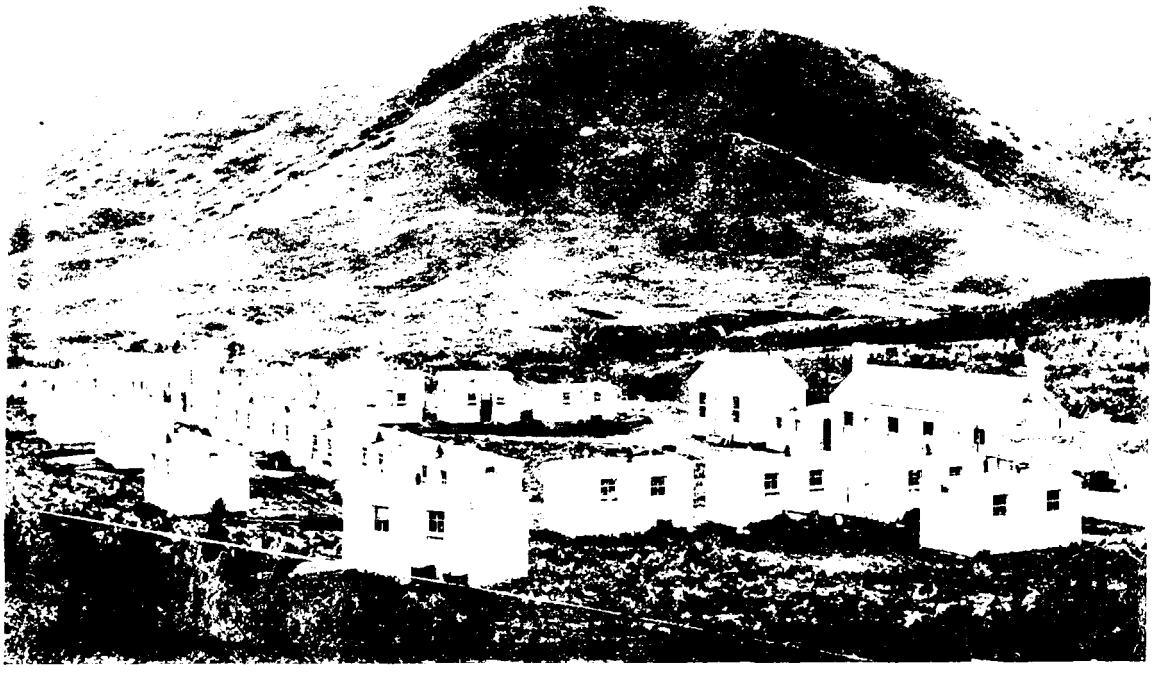
Statement of Expenditure.

	£	s.	d.
Amount at 31st March, 1907	8,717	5	5
Tree-growing	364	11	4
General maintenance and repairs	242	7	0
Nursery-formation	87	17	6
Horse-feed, purchased and grown	30	6	9
Tree-seeds	64	4	2
Tools, implements, &c.	4	1	0
Miscellaneous works	2	18	2
Supervision	14	11	0
Fuel and freight	9	19	3
	£9,538	1	7

Values of Stock.

	£	s.	d.	£	s.	d.	£	s.	d.
Amount at the 31st March, 1907				6,300	19	4			
Less value of trees	1,832	17	3						
" horse-feed ...	15	0	0						
				1,847	17	3			
							4,453	2	1
Trees, as per Schedule 1							555	2	6
" " 2							409	19	6
" " 3							782	3	4
Tools, implements, &c.							4	1	0
Nursery-formation							87	17	6
Horse-feed in stock							9	10	0
Increased value of foal							5	0	0
Value of foal							10	0	0
Improved value							213	7	0
							£6,540	2	11

3. Log hauling, Ronga Valley, Marlborough.



4. New Prison Camp, Waiotapu Plantation.

Summary.

	£	s.	d.
Value of present stock and general improvements ..	... 6,540	2	11
Value of trees sent out since initiation of nursery ...	... 3,862	0	11
	10,402	3	10
Expenditure to date	... 9,358	1	7
Credit balance	£1,044	2	3

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown 1907–8. (Twelfth Crop.)

Name of Tree.	Number in Seed-beds.	Height in Inches.	Amount of Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Pinus Laricio	250,000	1	82	1 0 0	250 0 0	Fair growth.
" Benthamiana (var.) ..	30,000	3	21	1 5 0	37 10 0	Very strong.
" " (true) ..	22,100	3	12	1 5 0	27 12 6	"
" ponderosa	40,000	3	12	1 5 0	50 0 0	"
Larix Europæa	200,000	1–6	168	1 0 0	200 0 0	"
Totals	542,100	..	295	..	565 2 6	

SCHEDULE 2.—Two-year-old Trees, grown 1906–7. (Eleventh Crop.)

Name of Tree.	Number in Seed-beds.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Pinus Austriaca	78,600	4	1 5 0	98 5 0	Strong plants.
" Laricio	162,000	4	1 5 0	202 10 0	"
" ponderosa	41,000	2–6	1 5 0	51 5 0	Very strong.
" Jeffreyii	1,450	2–6	1 10 0	2 3 6	Strong plants.
" Benthamiana ..	12,200	2–6	1 10 0	18 6 0	Sturdy plants.
Larix Europæa	12,000	8–15	1 5 0	15 0 0	Very good.
Pyrus aucuparia	7,500	12–15	3 0 0	22 10 0	Good (lined out).
Totals	314,750	..	..	409 19 6	

SCHEDULE 3.—Three-year-old Trees, grown 1905–6. (Tenth Crop.)

Name of Tree.	Number in Rows.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Pinus Austriaca	46,300	6	3 0 0	138 18 0	Medium growth.
" Laricio	7,600	4	3 0 0	22 16 0	"
" ponderosa	33,900	6	3 0 0	101 14 0	"
" Jeffreyii	190	6	3 0 0	0 11 4	Very good.
Larix Europæa	100,800	6	3 0 0	302 8 0	Fair.
" " (4-year) ..	35,800	12	4 0 0	143 4 0	Strong.
Cytisus vulgare	24,200	15–18	3 0 0	72 12 0	Strong plants.
Totals	248,790	..	..	782 3 4	

SCHEDULE 4.—Trees and Seeds sent from Nursery to Plantations, &c., 1907–8.

Date.	Where sent.	Name of Tree.	Number.	Value per Thousand.	Total Value.
				£ s. d.	£ s. d.
April and May..	Gimmerburn Plantation	Pinus Austriaca ..	133,000	3 0 0	399 0 0
		„ Laricio	72,000	3 0 0	216 0 0
		Larix Europæa ..	9,800	3 0 0	29 8 0
		„ „ ..	36,000	4 0 0	144 0 0
			250,800		788 8 0
June	Survey Paddock	Pinus Austriaca ..	11,600	3 0 0	34 16 0
		„ ponderosa ..	15,525	3 0 0	46 11 6
			27,125		81 7 6
June	Hanmer Springs	Pyrus aucuparia ..	200	2 0 0	0 8 0
		Cytisus vulgare ..	1,000	2 5 0	2 5 0
			1,200		2 13 0
October ..	Tapanui Nursery ..	30 lb. Pinus Laricio seed	..	£21/10/- cwt.	5 15 2
	Gimmerburn Reserve ..	..	250,800		788 8 0
	Survey Paddock ..	..	27,125		81 7 6
	Hanmer Springs ..	..	1,200		2 13 0
			279,125		872 8 6
	Tapanui Nursery ..	30 lb. seed	..		5 15 2
	Total	.. .. ..	..		878 3 8

A. W. ROBERTS,
Nurseryman in Charge.

HANMER SPRINGS NURSERY, CANTERBURY.

(Area, 34 acres; approximate altitude, 1,225 ft.)

The rainfall recorded for the past twelve months was considerably in excess of the previous year's fall: 48·44 in. falling on 116 days, compared with a total of 34·71 in. on 117 days during 1906–7. The heaviest monthly fall during the year was 12·11 in. during September, and the lowest 0·18 in. during February.

The highest temperature recorded during the year was 98° Fahr. on the 29th January, and the minimum 18° on the 5th August.

Although the rainfall for the whole year was not exceptionally low, the average fall for the four principal growing-months (November to February) only amounted to 1·5 in., consequently, the growth of all classes of nursery stock has been much below the usual, and the amount of labour required in watering seed-beds was greatly increased.

Transplanting of one-year-old trees was commenced on the 12th August, and completed on the 24th October. Owing to very wet weather prevailing during September, this work was in progress much longer than usual.

The number of trees lined out was 1,610,661, at an average cost per thousand of 1s. 5½d.

Owing to the very dry summer experienced, the percentage of deaths amongst lined-out trees was somewhat higher than usual, amounting to 5 per cent. in larch and from 10 per cent. to 15 per cent. amongst pines.

Lined-out larch made fair growth during the year, and more of these will be suitable for transfer to the plantation during the coming planting season, the height of this crop averaging from 6 in. to 15 in.

Pinus Laricio seem to have been affected most by the drought, but this is probably due to this species having been lined out rather late in the season; only a small percentage of these will be large enough for transfer to the plantation.

Seed-sowing was commenced on the 25th October, and completed on the 4th November, favourable weather being experienced while this work was in progress.

All seed sown germinated well, with the single exception of *Picea sitchensis*, which was practically a failure.

The crop of seedling larch is a particularly fine one, the average height of plants being 4 in., and the approximate number in seed-beds 1,000,000 plants.

The various species of pine-seed germinated rather thinly, but the plants are much stronger than if grown more thickly in beds.

A small amount of alder-seed sown produced an excellent crop of sturdy plants of an average height of 8 in.; most of these will be suitable to transfer direct to the plantation without lining out.

The number of trees raised from seed during the year was 1,695,000, valued at £1,693 10s., and the number of trees raised in the nursery to date since its inception is 4,441,331, valued at £8,375 19s. 7d.

On the 31st March the total number of trees of all ages in the nursery was 2,986,200, and their value £4,865 8s. 6d.

The number of trees transferred to the plantation during the year was 635,180, valued at £1,444 10s.

Various improvements have been carried out during the year; the formation of shelter-breaks around the nursery-boundary being completed, and a number of ornamental trees and shrubs planted on several small areas of spare land throughout the nursery.

During the summer an area of 8 acres adjoining the nursery was cleared of scrub and other growth, and partly broken up and graded for the purpose of forming extension to lining-out ground. To give access to this area about 15 chains of road was formed through a swamp, and a considerable amount of labour was necessary in draining and forming culverts to carry away surface water during winter.

As the water-supply obtained from a spring in the nursery was found quite inadequate, about 80 chains of galvanised pipe (2 in. to 1¼ in.) was laid from the high-pressure system at Hanmer Township to the Nursery, and a plentiful supply of good water obtained, with sufficient pressure for all nursery purposes.

Twenty acres of land adjoining the stable was ploughed and cultivated for the purpose of forming a paddock for the horses, and during October about 12 acres of this was sown in grasses and clover, with very favourable results, considering the dry season.

For the purpose of forming shelter for horse-paddocks, some 4,000 *Pinus muricata* were planted in three rows on the exposed sides of paddocks, with good results, only a small percentage of failures having occurred.

A portion of the fencing required to enclose paddocks was erected by prison labour, and the whole will be enclosed as soon as posts can be procured.

It was found necessary to provide additional accommodation for horses, and to meet requirements the erection of a five-stall stable was commenced during March. When this building is completed, the old stable will be utilised for the storage of horse-feed and implements.

The average number of hands employed daily throughout the year was five men and two boys.

About 9 tons of oat-sheaf was grown during the year: this was cut into chaff during March, the value of same being £45.

The crop of carrots and swedes grown for horse-feed was fairly good, the estimated yield being about 4 tons.

Schedules are appended of trees in stock and sent out during the year, also details of expenditures and values to date.

The following is a record of the rainfall and temperatures for the year:—

Month.	Rainfall.	Number of Days Rain fell.	Maximum Temperature.	Date.	Minimum Temperature.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	3·14	10	74	7th	28	30th
May	3·45	16	60	2nd	28	15th
June	2·95	9	60	5th	21	21st
July	4·11	12	55	1st	21	11th
August	3·86	8	60	9th	18	5th
September	12·11	17	60	3rd	28	17th
October	3·52	14	81	29th	28	7th
November	1·86	6	86	22nd	34	1st
December	0·80	2	95	29th	50	1st
1908.						
January	1·35	3	98	29th	32	18th
February	0·18	5	85	28th	36	20th
March	11·11	14	86	3rd	34	16th
Totals	48·44	116	...	...	...	...

Statement of Expenditure.

	£	s.	d.
Amount at the 31st March, 1907	2,676	12	7
Tree-growing	515	18	1
General maintenance and repairs	80	11	4
Nursery-formation	95	12	10
Horse-feed, purchased and grown	47	14	3
Manures	6	6	2
Tree-seeds	80	4	11
Tools, implements, &c.	69	11	7
Water-supply	95	7	0
Buildings—Stable, alterations to office, and Forester's quarters	137	5	8
Miscellaneous works	9	2	0
Proportion of Nurseryman's salary	85	0	0
Supervision	24	2	0
	£3,923	8	5

Value of Stock.

	£ s. d.	£ s. d.	£ s. d.
Amount at the 31st March, 1907		4,877 7 10	
Less value of trees at 31st March, 1907	3,586 5 9		
Less horse-feed in stock at 31st March, 1907	13 0 0		
		3,599 5 9	
			1,278 2 1
Trees, as per Schedule 1			1,693 10 0
" " 2			2,062 6 6
" " 3			935 2 0
" " 4			174 10 0
Tools and implements			69 11 7
Water-supply			95 7 0
Nursery-formation			95 12 10
Buildings			137 5 8
Improved value			109 2 0
Horse-feed in stock			40 0 0
Seed-frames transferred from Kurow Nursey			120 0 0
Tools and implements from Kurow Nursery			81 11 2
Water-pipes, &c., from Kurow Nursery			25 12 11
			£6,917 13 9

Summary.

	£ s. d.
Value of present stock and general improvements	6,917 13 9
Value of trees sent out since initiation of nursery	3,889 10 7
	10,807 4 4
Expenditure to date	3,923 8 5
Credit balance	£6,883 15 11

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown 1907–8. (Sixth Crop.)

Name of Tree.	Number in Seed-beds.	Height in Inches.	Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Larix Europæa	1,000,000	2–6	224	1 0 0	1,000 0 0	Good crop.
Pinus Laricio	500,000	3	112	1 0 0	500 0 0	"
" ponderosa	63,000	3	12	1 0 0	63 0 0	Thin crop.
" Benthamiana	25,000	3	12	1 5 0	31 5 0	"
" Benthamiana (var.) ..	20,000	3	21	1 5 0	25 0 0	"
Alnus glutinosa	18,000	8	10	0 15 0	13 10 0	Good crop.
Robinia pseudo-acacia	34,000	6	10	0 10 0	17 0 0	"
Picea sitchensis	1,000	1	5	1 5 0	1 5 0	Poor crop.
Pseudo-tsuga taxifolia	34,000	2	10	1 5 0	42 10 0	Fair crop.
Totals	1,695,000	..	..	..	1,693 10 0	

SCHEDULE 2.—Two-year-old Trees, grown 1906–7. (Fourth Crop.)

Name of Tree.	Number in Nursery Lines.	Number in Seed-beds.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
				£ s. d.	£ s. d.	
Larix Europæa	400,900	..	6–15	2 5 0	902 0 6	Fair crop.
Pinus Laricio	362,100	..	2–4	2 5 0	814 14 6	"
" Austriaca	87,600	..	3–4	2 5 0	197 2 0	"
" ponderosa	36,500	..	3–5	2 5 0	82 2 6	Good crop.
Pseudo-tsuga taxifolia	17,500	..	3–5	2 10 0	43 15 0	Fair crop.
Alnus glutinosa	4,000	..	6–12	2 0 0	8 0 0	Good crop
Betula alba	..	10,000	6–12	1 5 0	12 10 0	"
Cotoneaster Simmondsii ..	..	1,400	2–4	1 10 0	2 2 0	"
Totals	908,600	11,400	..	..	2,062 6 6	

SCHEDULE 3.—Three-year-old Trees, grown 1905–6. (Fourth Crop.)

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Larix Europæa	147,500	6–15	3 0 0	442 10 0	Good crop.
Pinus Laricio	156,900	3–6	3 0 0	470 14 0	"
" ponderosa	7,300	4	3 0 0	21 18 0	"
Totals	311,700	..	..	935 2 0	

SCHEDULE 4.—Four-year-old Trees, grown 1904–5. (Third Crop.)

Name of Trees.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Betula alba	1,500	24	3 0 0	4 10 0	Good growth.
Pinus muricata	6,000	12	3 0 0	18 0 0	"
Picea sitchensis	50,000	15	3 0 0	150 0 0	"
Berberis aristata	2,000	12	1 0 0	2 0 0	"
	59,500			174 10 0	

SCHEDULE 5.—Trees transferred to Hanmer Springs Plantation.

Name of Tree.	Number.	Value per Thousand.	Total Value.	Remarks.
		£ s. d.	£ s. d.	
Larix Europæa	196,750	2 5 0	442 13 9	Fair growth.
Pinus Laricio	299,425	2 5 0	673 14 1	"
" ponderosa	61,700	2 5 0	138 16 6	"
" Benthamiana	20,400	2 10 0	51 0 0	"
" Austriaca	42,520	2 5 0	95 13 5	Good growth.
" Jeffreyii	150	2 5 0	0 6 9	"
" contorta	1,200	2 5 0	2 14 0	"
" muricata	9,760	3 0 0	29 5 6	"
Betula alba	1,375	3 0 0	4 2 6	Fair growth.
Pseudo-tsuga taxifolia	1,500	3 5 0	4 17 6	"
Picea sitchensis	400	3 5 0	1 6 0	"
Totals	635,180	..	1,444 10 0	

T. B. CURLE,
Nurseryman in Charge.

KUROW NURSERY.

(Area, 45 acres; altitude, 676 ft.)

Rain fell on ninety-four days during the year, with a total fall of 14·43 in. The maximum monthly fall was registered in September, when 2·88 in. fell on twelve days.

The maximum temperature registered was 101°, minimum 20°. Barometer mean for the year 29·12.

The light rains experienced during the spring months were only of temporary benefit, the fall not being sufficient to moisten the subsoil. Growth made fair progress until December; the drought then set in, and intense heat and strong parching winds soon dried out what little moisture was in the soil. The great thing necessary at Kurow seems to be a "a good hard winter," with plenty of snow to thoroughly saturate the subsoil. Apparently, the average winter is much too dry and mild; consequently, under the conditions obtaining successful tree-growing and nursery-work generally is an impossibility.

Tree-seeds, One-year Seedlings.—To further test the possibilities of successful growth, a small mixed sowing of tree-seeds was made on the 18th October. With a few exceptions the braird was satisfactory. The growth at first lacked colour and vigour; subsequently, with careful treatment, and the absence of surface-watering, the seedlings improved and strengthened. The crop was grown on without any watering till the 3rd February. Owing to the great heat and long drought, to keep the trees alive, surface-watering had to be done almost every night during February. The unfavourable conditions soon told on the seedlings; the larch especially began to dwindle away and die off in patches, the bark of the roots from the ground-line being scalded and dried up; the pines stood the severe conditions much better—only a few of them were affected.

Fourteen acres of the nursery-ground was sown down in oats: the growth was poor, the grain light and shelly.

Total number of trees in nursery at the 31st March is 43,000, value £45 3s.; number of trees sent out to other nurseries during the year is 110,260, value £212 15s. Total number of trees grown at nursery since its inception is 219,000, value £223 3s.

Average daily number of men employed during the year, 2·16.

Amount of horse-feed grown, 14 acres oats, value £40.

Expenditure for the year, £579 0s. 1d.; expenditure to date, £3,070 2s. 7d.

Value of stock and improvements at 31st March, 1908, £2,367 11s. 5d.

The following is a record of the rainfall and temperature for the year:—

Month.	Rainfall.	Number of Days Rain fell.	Maximum Temperature.	Date.	Minimum Temperature.	Date.
1907.	Inches.		Degrees.		Degrees.	
March	1·78	14	88	3rd	33	24th
April	0·78	9	80	8th	28	28th
May	0·78	8	65	1st	22	19th
June	0·11	4	59	30th	22	25th
July	0·37	5	58	3rd	20	11th
August	2·08	7	59	31st	24	5th
September	2·88	12	63	24th	28	14th
October	1·39	8	80	31st	32	9th
November	1·46	6	85	6th	30	14th
December	1·66	10	100	30th	36	26th
1908.				8th		
January	0·53	6	101		37	18th
February	0·61	5	98	7th	32	1st
Totals	14·43	94	...	...	...	...

Statement of Expenditure.

Expenditure.	£	s.	d.
Amount at the 31st March, 1907	2,491	2	6
Tree-growing	128	2	3
General maintenance and repairs	15	9	9
Nursery-formation	20	3	3
Horse-feed purchased and grown	29	3	2
Tree-seeds	7	12	1
Tools, implements, &c.	7	17	9
Seed-frames	6	11	4
Water-supply	7	12	2
Buildings	30	9	1
Miscellaneous works	142	19	3
Proportion of Nurseryman's salary	171	0	0
Supervision	12	0	0
	£3,070	2	7

Value of Stock.

	£	s.	d.	£	s.	d.	£	s.	d.
Amount at the 31st March, 1907 ...	...			...			2,515	14	4
Less value of trees at 31st March, 1907	447	17	0						
Less horse-feed in stock at 31st March, 1907	41	2	6						
				488	19	6			
							2,026	14	10
Trees, as per Schedule 1							45	3	0
Tools and implements							7	17	9
Water-supply							7	12	2
Seed-frames							6	11	4
Nursery-formation							20	3	3
Buildings...							30	9	1
Improved value							183	0	0
Horse-feed in stock							40	0	0
							£2,367	11	5

Summary.

	£ s. d.
Value of present stock and general improvements ...	... 2,367 11 5
„ trees sent out	... 212 15 0
	£2,580 6 5
Expenditure to date	... 3,070 2 7
Debit balance	... £489 16 2

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown in 1907–8. (Second Crop.)

Name of Trees.	Number in Seed-beds.	Height in Inches.	Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Larix Europæa	20,000	1½–6	20	1 0 0	20 0 0	
Pinus ponderosa	3,000	1–2	2	1 0 0	3 0 0	
„ Laricio	15,000	1–2	7	1 0 0	15 0 0	
„ Austriaca	3,500	1½–2	2	1 0 0	3 10 0	
Sequoia sempervirens	600	2–4	1	4 0 0	2 8 0	
Cupressus Goveniama	100	1½–4	0½	1 10 0	0 3 0	
„ Majestigma	200	1–3	0½	1 10 0	0 6 0	
Thuja Orientalis	200	2–3	1 oz.	1 10 0	0 6 0	
Pseudo-tsuga taxifolia	400	2–3	1 lb.	1 5 0	0 10 0	
Totals	43,000	..	..	..	45 3 0	

SCHEDULE 2.—Trees, &c., transferred to other Nurseries, 1907–8.

Where sent.	Name of Tree, &c.	Number.	Value per Thousand.	Total Value.
			£ s. d.	£ s. d.
Tapanui	Pinus Laricio	13,260	1 0 0	13 5 0
	„ Austriaca	8,500	1 0 0	8 10 0
	„ muricata	1,500	1 0 0	1 10 0
	Pseudo-tsuga taxifolia	2,500	1 5 0	3 2 6
	Pinus Laricio	28,000	2 5 0	63 0 0
	„ Austriaca	6,000	2 5 0	13 10 0
	„ ponderosa	2,000	2 5 0	4 10 0
	„ muricata	1,500	2 5 0	3 7 6
	Larix Europæa	44,000	2 5 0	99 0 0
		107,260	..	209 15 0
Hanmer	Berberis aristata	3,000	1 0 0	3 0 0
		110,260	..	212 15 0
			Value.	
Starborough	182 bushels feed-oats, at 2s. 6d. ..	..	22 15 0	
	52 sacks, at 7d.	..	1 10 4	24 5 4
Hanmer	96 seed-frames	..	120 0 0	..
	Fencing-material	..	11 3 2	..
	Horse-feed	..	2 14 0	..
	Tools and implements	..	81 11 2	..
	Sundry supplies	..	17 5 9	..
	Water-pipes and fittings	..	30 17 0	263 11 1
Tapanui	Fencing material	..	140 7 3	..
	Tools and implements	..	139 11 9	..
	99 seed frames	..	123 15 0	..
	Sundry supplies	..	7 8 0	..
				411 2 0
				£911 13 5

N. CRAIG,
Nurseryman in Charge.

Rotorua Nursery.

(Approximate area, 85 acres; approximate altitude, 1,000 ft.)

The results of the last year's operations at this nursery are most satisfactory, in spite of the fact that extremes of weather were experienced. From April to December the rainfall was very heavy, while the months of January and February were extremely dry and hot.

Rain fell on 139 days during the year, with a total fall of 55·56 in., this being less than that recorded the previous year—namely, 69·03 in. on 174 days.

The minimum shade temperature was 21° Fahr., or 11° of frost on the 8th June and 25th July; and the maximum temperature was recorded on the 17th December, with 92° Fahr.

Last winter's work was perhaps the heaviest on record, seven million trees of various ages being handled in one way or another. Lifting and counting the lined-out trees in readiness for the plantation cost on an average 2s. 6d. per thousand. Sizing seedlings cost 2s. per thousand. Lining out seedlings cost 1s. 7d. per thousand; and mossing 379,000 eucalypti cost 12s. 6d. per thousand (this rate includes, besides the actual mossing, the cost of gathering moss and flax, and lifting trees and heeling in).

Trees sent out during the year to plantation reserves, &c., number 4,813,367, and are valued at £8,498 15s. 4d. (details are shown in Fourth Schedule appended), and the total number of trees sent out from the nursery since its inception is 17,801,299, valued at £37,009 4s. 6d.

Seed-sowing was completed under very adverse weather-conditions. A start was made during the last week of September, and 30 lb. of pine-seeds sown, but, owing to rain, it was impossible to make further sowings until the 18th October, and from then until the end of Novebmer, when the sowing was completed, the weather was very broken, and the work much retarded in consequence.

The crop of seedling trees is exceptionally fine, all species having germinated well, with the exception of *Pinus strobus*, and this may be classed as moderately good.

Californian redwood is the finest crop of this species that has been obtained here during the last seven years.

Larch is a better crop than was obtained last year, both in regard to the percentage of germination and to the size of the young trees, 50 per cent. of which are from 3 in. to 6 in. high, and will need to be lifted from the seed-beds and transplanted into the nursery rows. The three species of eucalypti sown germinated well and evenly, the result from 19 lb. of seed being about 750,000 trees. The number of trees raised from seed during the year is 4,550,000, and their value £4,537 10s.

Two-year-old seedlings have made good growth, and fully 75 per cent. of these will be available for transferring to the plantations during next winter. The grass-grub has not been nearly so plentiful during the summer as it was last year, and, with the exception of one or two small patches, the trees are remarkably healthy.

Amongst the lined-out trees the results are most gratifying, all species having made good growth, and the only deaths that are at all noticeable are amongst *Pinus Laricio*, where about 10 per cent. have succumbed owing to the drought. The rate of growth generally throughout the lined-out trees is perhaps less than usual, owing to the dry summer, but all the trees are of a suitable size for sending to the plantations.

A few hundred *Pinus Torreyana* were transplanted into nursery lines, but with poor results. From trials extending over three years with this species it would appear that it is unprofitable to grow owing to the large percentage of deaths when transplanting. In this respect it resembles *P. Canariensis:* it makes rapid growth in the seed-beds, produces a long straight tap-root and very few secondary roots, even when "wrenched."

The number of trees of all ages in the nursery at the 31st March is estimated at 7,864,700, and their value £10,857 9s.

The general formation scheme has progressed well during the year. The area acquired next the cemetery reserve was enclosed with a rabbit-proof fence, while the entrance-gate was improved by erecting a chain of picket fence on either side. On this area all the odd corners have been planted with flax, about 2,000 plants being used, and inside the fence-line next to the public road a row of liriodendron was planted.

Improvements to roads—such as grading—were also affected, and several of the most-used ones were gravelled. A shelter-shed 16 ft. by 12 ft. was erected on the nursery extension in a position equally convenient from both sides of the Puerenga Stream. This has been of great benefit to the workers during showery weather, and much time is saved by storing the tools here at night instead of bringing them to the workshop.

In order to economize space on the seed-beds 100 of the 3 ft. wide frames were dismantled and reconstructed into 6 ft. ones. Material for 200 3 ft. frames was received from Starborough Nursery, and it is proposed to convert these into 6 ft. ones before next spring. The stock of seed-frames will then number 1,181.

The water-supply has been in a most unsatisfactory condition during the past season, there being sufficient only to meet the requirements of the stables and cottages, and little or none for use on the seedlings. The supply-pipe that was laid down about ten years ago consists of about half a mile of 1 in. pipe, which passes through land permeated with sulphur and other minerals, and, owing to the numerous *ngawhas*, the route is a very circuitous one. The pipe at present is very much corroded, and inside it is thickly coated with a white deposit, thus reducing its carrying-capacity by about a fourth. From the foregoing particulars it may be perceived that the supply is not a plentiful one, nor the pressure great. Owing to the numerous leaks, it would probably be necessary to lift and renew almost the whole length of the pipe, but in order to avoid the

5. View of Rotorua Nursery.

sulphurous ground it is proposed to bring in a supply by another route that will be more convenient, although slightly further. The new supply-pipe will be a 2 in. one, and it is thought that this will meet the requirements of the nursery more fully.

The alteration made to the sizing-shed, as explained in last year's report, made the use of the fireplaces for heating the building unsafe, and in order to remedy this hot-water pipes were laid on both the top and bottom stories. The installation, which consists of a built-in boiler constructed with a coil of pipes and 4 in. flanged cast-iron pipes through the building, is most satisfactory, and much appreciated by the workers during the frosty weather.

The implement-shed is now too small for the requirements of the place. This is due to the increased number of ploughs and harrows required for cultivating the ever-increasing length of fire-breaks at the Whakarewarewa Plantation. This shed would be large enough to hold the implements only, but when the two wagons and two light traps are also there everything is cramped up inconveniently. As the shed is open it is impossible to keep the vehicles clean during the dusty weather, and it is suggested that a separate building be erected to accommodate the vehicles, and thus leave the shed free for implements that cannot be harmed by the dust or sun. When the question of a building for the vehicles is being considered, it would be advisable to provide also for three loose-boxes for horses; first, because there is not sufficient room to accommodate the four new horses recently purchased; and, secondly, because loose-boxes would be more useful than the stalls in the present stable for dealing with a sick or a young horse.

Further accommodation at the Nurseryman's cottage and the men's quarters is badly needed.

The average daily number employed during the year was 24·69 men and 7·45 women: total, 32·14.

Details of expenditure and values and schedules of trees in stock and sent out during the year are appended.

Following is a record of rainfall and temperature for the year:—

Month.	Rainfall.	Number of Days Rain fell.	Highest Reading of Thermometer.	Date.	Lowest Reading of Thermometer.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	8·05	15	78	9th	32	3rd
May	5·40	13	72	3rd	28	21st
June	2·66	7	65	2nd	21	8th
July	2·71	11	66	4th	21	25th
August	4·89	18	60	15th	23	4th
September	4·77	17	65	22nd and 23rd	25	15th
October	7·46	16	74	29th	26	6th
November	3·79	11	78	25th and 28th	31	16th
December	8·29	10	92	17th	41	28th, 29th, and 31st
1908.						
January	0·05	1	90	9th	36	7th and 18th
February	1·03	5	90	19th	37	2nd
March	6·465	15	83	7th	32	17th
Totals	55·565	139	...	...	...	...

Statement of Expenditure.

	£	s.	d.
Amount at 31st March, 1907	21,612	4	5
Tree-growing	2,507	7	2
General maintenance and repairs	275	6	6
Nursery-formation	162	6	2
Horse-feed purchased and grown	161	4	7
Manures	86	16	9
Tree-seeds	199	5	4
Tools, implements, &c.	52	2	3
Seed-frames	87	0	11
Water-supply	3	5	5
Buildings—Installation of hot-water service in workshop, benches in workshop, building shelter-shed	87	13	11
Fencing	56	3	9
Miscellaneous works	13	15	10
Proportion of Nurseryman's salary	160	0	0
Clerical assistance	23	12	0
Supervision	38	14	0
	£25,526	19	0

Value of Stock.

	£ s. d.	£ s. d.	£ s. d.
Amount at 31st March, 1907		15,727 19 6	
Less value of trees	8,871 12 6		
" horse-feed in stock	46 0 0		
		8,917 12 6	
			6,810 7 0
Trees, as per Schedule 1			4,537 10 0
" " 2			4,357 14 0
" " 3			1,962 5 0
Tools and implements			52 2 3
Water-supply			3 5 5
Seed-frames			87 0 11
Nursery-formation			162 6 2
Fencing			56 3 9
Buildings			87 13 11
Improved value			198 14 0
Horse-feed in stock			42 0 0
Value of young horses bred or increased in value during year ...			10 0 0
			£18,367 2 5

Summary.

	£ s. d.
Value of present stock and general improvements	18,367 2 5
Value of trees sent out since initiation of nursery	37,009 4 6
	55,376 6 11
Expenditure to date	25,526 19 0
Credit balance	£29,849 7 11

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown 1907. (Ninth Crop.)

Name of Tree.	Number in Seed-beds.	Height in Inches.	Amount of Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Larix Europæa	3,000,000	1–6	672	1 0 0	3,000 0 0	All splendid crops, except Pinus strobus, which germinated thinly.
Pinus Laricio	500,000	3	200	1 0 0	500 0 0	
" ponderosa	45,000	3	14	1 0 0	45 0 0	
" " var. Benthamiana	80,000	3	50	1 5 0	100 0 0	
" strobus	15,000	1	21	1 0 0	15 0 0	
Pseudo-tsuga taxifolia	50,000	4	10	1 5 0	62 10 0	
Sequoia sempervirens	110,000	5	24	4 0 0	440 0 0	
Eucalyptus amygdalina	180,000	4	7	0 10 0	90 0 0	
" pauciflora	140,000	4	5	0 10 0	70 0 0	
" Stuartiana	430,000	4	7	0 10 0	215 0 0	
Totals	4,550,000	..	..	..	4,537 10 0	

SCHEDULE 2.—Two-year-old Trees, grown 1906–7. (Eighth Crop.)

Name of Tree.	Number in Seed-beds.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
				£ s. d.	£ s. d.	
Betula alba	..	5,000	8	2 5 0	11 5 0	All very good crops.
Larix Europæa	1,500,000	380,000	12	1 5 0	1,875 0 0	
			18	2 5 0	855 0 0	
" Austriaca	110,000	..	4	1 5 0	137 10 0	
" Laricio	..	500,000	3	2 5 0	1,125 0 0	
" ponderosa	..	75,000	4	2 5 0	168 15 0	
" " var. Benthamiana	..	50,000	4	2 10 0	125 0 0	
" strobus	40,000	..	3	1 5 0	50 0 0	Poor, suffered by drought.
Sequoia sempervirens	..	1,700	6	6 0 0	10 4 0	Very fine.
Totals	1,650,000	1,011,700	..	..	4,357 14 0	

SCHEDULE 3.—Three-year-old Trees, grown 1905–6. (Seventh Crop).

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Larix Europæa	170,000	15	3 0 0	510 0 0	Very good results have been obtained with all these trees.
Pinus Austriaca	13,000	3	3 0 0	39 0 0	
„ Laricio	250,000	5	3 0 0	750 0 0	
„ Murrayana	7,000	6	3 0 0	21 0 0	
„ ponderosa	200,000	4	3 0 0	600 0 0	
„ ponderosa, var. Benthamiana ..	13,000	3	3 5 0	42 5 0	
Totals	653,000	..	..	1,962 5 0	

SCHEDULE 4.—Trees, &c., transferred from Rotorua Nursery to Forest Plantations, &c., 1907–8.

Where sent.	Name of Tree.	Number.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
				£ s. d.	£ s. d.	
Whakarewarewa Plantation	Acacia melanoxylon ..	74,300	4	2 0 0	148 12 0	Very good results have been obtained amongst all trees planted.
	Eucalyptus amygdalina ..	105,910	4	1 10 0	158 17 3	
	„ Stuartiana ..	208,960	4	1 10 0	313 8 9	
	Juniperus Virginiana ..	670	12	2 0 0	1 6 9	
	Larix Europæa	487,200	18	2 5 0	1,096 4 0	
	„	384,850	18	3 0 0	1,154 11 0	
	Pinus Laricio	600,700	3	1 5 0	750 17 6	
	„ muricata	800	12	2 5 0	1 16 0	
	Pseudo-tsuga taxifolia ..	68,750	9	3 5 0	223 8 9	
	Sequoia sempervirens ..	11,850	8	4 0 0	47 8 0	
		1,943,990			3,896 10 0	
Waiotapu Plantation	Larix Europæa	723,000	18	2 5 0	1,626 15 0	The results are satisfactory except in the case of *Pinus Laricio*, a number of which succumbed owing to protracted drought.
	„	611,200	18	1 5 0	764 0 0	
	„	328,750	6	1 0 0	328 15 0	
	Pinus Austriaca	154,900	3	1 5 0	193 12 6	
	„	73,350	4	3 0 0	220 1 0	
	„ contorta	8,000	6	3 0 0	24 0 0	
	„ excelsa	200	6	3 0 0	0 12 0	
	„ Jeffreyii	860	6	3 5 0	2 15 10	
	„ Lambertiana ..	75	6	3 5 0	0 4 10	
	„ Murrayana ..	4,100	6	1 5 0	5 2 6	
	„ Laricio	63,500	4	3 0 0	190 10 0	
	„ „	637,925	3	1 5 0	797 8 1	
	„ ponderosa	22,050	4	3 0 0	66 3 0	
	„ „	157,825	3	1 5 0	197 5 7	
	„ „ var. Benthamiana	10,250	4	3 5 0	33 6 3	
	„ ditto	46,075	3	1 10 0	69 2 3	
	„ rigida	6,200	6	3 0 0	18 12 0	
	„ resinosa	2,100	6	3 0 0	6 6 0	
	„ strobus	8,750	4	3 0 0	26 5 0	
	Thuja gigantea	800	8	3 0 0	2 8 0	
		2,859,910			4,573 4 10	
Ruatangata Nursery	Juglans nigra	4,800	18	3 0 0	14 8 0	
	Hikora ovata	2,525	6	3 0 0	7 11 6	
	Sophora Chathamica ..	30	6	2 10 0 (per 100)	0 15 0	
	Pinus muricata	200	12	1 0 0	0 4 0	
	Cordyline Australis ..	500	6	1 0 0	0 10 0	
	Phormium, var.	500	6	1 0 0	0 10 0	
Totals ..	..	8,555			23 18 6	

Where sent.	Description.	Number.	Value.
			£ s. d.
Whakarewarewa Plantation	As per details above	1,943,990	3,896 10 0
Waiotapu Plantation	„	2,859,910	4,573 4 10
Ruatangata Nursery	„	8,555	23 18 6
Oturoa School Committee	Shelter and ornamental trees ..	212	1 12 0
Native School, Oruanui	Shelter-trees	200	1 0 0
Native School, Port Awanui	Shelter and ornamental trees ..	500	2 10 0
		4,813,367	8,498 15 4

H. A. GOUDIE,
Nurseryman in Charge.

Ruatangata Nursery

(Area, 65 acres; altitude, 320 ft.)

The past year has been the wettest experienced here since the inception of the nursery, rain falling on 200 days, with a total fall of 95·66 in., the maximum rainfall being in March, when 13·78 in. were recorded for twenty days. January and February were exceedingly dry months, the respective records being 0·19 in. and 0·68 in.; and for the corresponding months of last year the rainfall was 11·41 in. and 11·30 in.

Maximum temperature, 82°; and minimum temperature, 30°.

The year, taken as a whole, has been an exceedingly good one for tree-growing and cropping.

Trees to the number of 268,750 were lined out at an average cost of 3s. 5¼d. per thousand. This work was commenced on the 13th June, and, owing to unfavourable weather, was not completed until the 15th October. *Podocarpus totara* have made excellent growth, some thousands attaining a height of 2 ft. 6 in. Kahikatea, juniper, redwood, &c., have done well; tideland, spruce have made only fair growth; while Oregon pine have proved a complete failure.

Podocarpus seed was gathered in September, and kept moist in a pit, with the result that from about 60 lb. of seed a crop of 157,000 fine strong plants resulted.

Very satisfactory results were obtained from 12 lb. *Sequoia sempervirens* seed, sown on the 19th October. The seed produced 37,000 sturdy seedlings about 4 in. in height.

On the 13th November 2 lb. each of the following eucalypti-seed were sown—*Eucalyptus rostrata, E. resinifera,* and *E. redunca;* and on the 9th December the same quantities of *E. amygdalina* and *E. Stuartiana,* also 3 lb. *Acacia melanoxylon* seed: all of these have done well. The different species of eucalypti grown in the experimental plantation have done well, with the exception of *Eucalyptus reynans, E. crebra,* and *E. teretecornis. E. hæmastoma* has attained a height of 15 ft., with a girth of 14 in.; *E. virgata, E. pauciflora, E. Stuartiana, E. amygdalina, E. corynocalyx,* Californian, and redwood have done well.

Cork-oaks are growing slowly, but 240 seedlings are doing well.

Suitable labour not being procurable in the district, six Natives (two men, four women) were temporarily transferred from Rotorua Nursery to this station for the purpose of mossing the eucalypti. 353,230 trees were mossed at an average cost of 10s. 3d. per thousand, details of which will be found on Schedule 4.

The total number of trees of all ages in the nursery at 31st March, 1908, was 761,410, valued at £1,715 4s. 3d.; 490,790 trees, valued at £1,295 11s. 8d., were transferred to Puhipuhi Plantation during the season.

The approximate number of trees available for planting this season is 585,000. The total number of trees raised in this nursery since May, 1903, is 1,637,868, valued at £4,073 13s. 9d.

The total number of trees transferred to Puhipuhi Plantation since the inception of this nursery is 951,795, valued at £2,562 18s. 4d.

Buildings.—An additional room, 10 ft. by 12 ft., was added to the Natives' whare; and, the workshop being too small for the accommodation of Natives mossing gums, the implement-shed was converted into a workshop, and a lean-to erected for implements, &c.

General.—During the summer land was graded for lining-out ground; seed-bed ground extended; 16 chains of stone drains, 4 ft. by 3 ft., and 4¼ chains 3 in. drain-tiles, were put down for the purpose of draining the nursery; 15 chains of drains were opened up in the horse-paddock; the metalling of main road was completed; main entrance-gates were removed to a more convenient site; and a 5 ft. picket fence erected 22 ft. on either side. For the purpose of carting stone for drains, a road was formed through to back paddock, this necessitating a breast cutting of 2 chains in length, averaging about 4 ft. deep, the road being 10 ft. wide. A stone culvert was built, 14 ft. wide, across the creek, behind the stable. An odd corner in the nursery, about one-third of an acre, was planted with flax at 8 ft. apart, and is doing well.

Eight chains of boundary-fencing was re-erected, the former posts having rotted, and the wire having been rendered worthless owing to the continuous fires in gorse on adjoining land.

Oaten sheaves were grown to the value of £72.

The average number of persons employed during the year was—men, 8·32; boys, 1·22; women, 1·46: total, 11.

The following is a record of the rainfall and temperature for the year:—

Month.	Rainfall.	Number of Days of Rain.	Maximum Temperature.	Date.	Minimum Temperature.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	9·87	15	78	25th	38	1st
May	5·14	14	65	4th	30	15th
June	8·83	15	62	5th and 6th	30	17th
July	11·39	29	62	22nd	33	10th
August	11·26	27	59	19th and 30th	33	4th and 12th
September	4·59	20	66	26th	30	18th
October	6·54	16	68	24th	35	17th
November	3·23	14	74	28th	42	1st
December	10·16	14	79	16th	45	2nd and 4th
1908.						
January	0·19	3	82	11th	48	19th
February	10·68	13	79	16th	45	8th and 14th
March	13·78	20	80	6th	42	17th
Totals	95·66	200	...	...	...	...

Statement of Expenditure.

	£	s.	d.
Amount at 31st March, 1907	4,384	2	3
Tree-growing	538	10	8
General maintenance and repairs	51	14	1
Nursery-formation	229	10	8
Horse-feed purchased and grown	67	18	9
Manures	8	1	6
Tree-seeds	29	16	0
Tools, implements, &c.	33	13	6
Seed-frames (transferred from Starborough)	40	16	1
Water-supply	19	15	1
Buildings—men's quarters, workshop, and lean-to	208	17	0
Fencing	6	1	3
Miscellaneous works	19	8	8
Proportion of Nurseryman's salary	142	0	0
Supervision	21	6	0
Maintenance of plantation	31	2	0
Mossing eucalypti	180	13	1
	£6,013	6	7

Value of Stock.

	£	s.	d.	£	s.	d.	£	s.	d.
Amount at 31st March, 1907				3,973	16	4			
Less value of trees	1,434	5	10						
" horse-feed ...	54	0	0						
" tools written off during year ...	25	3	9						
" one filly foal, died ...	5	0	0						
				1,518	9	7			
							2,455	6	9
Trees, as per Schedule 1							718	15	3
" " 2							952	9	3
" " 3							43	19	9
Tools and implements							33	13	6
Water-supply							19	15	1
Seed-frames							40	16	1
Nursery-formation							229	10	8
Fencing							6	1	3
Buildings...							208	17	0
Improved value							163	6	0
Horse-feed in stock							72	0	0
Value of young horses bred (one colt)							5	0	0
							£4,949	10	7

Summary.

	£	s.	d.
Value of present stock and general improvements	4,949	10	7
Value of trees sent out since initiation of nursery	2,562	18	4
	7,512	8	11
Expenditure to date	6,013	6	7
Credit balance	£1,499	2	4

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown 1907–8. (Fifth Crop.)

Name.	Number in Seed-beds.	Height in Inches.	Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Podocarpus totara ..	157,000	3	120	2 10 0	392 10 0	Fine sturdy plants.
Sequoia sempervirens ..	37,298	4	12	4 0 0	149 4 0	Splendid plants.
Acacia melanoxylon ..	5,332	4	3	2 0 0	10 13 3	Uneven growth, but nice plants.
Eucalyptus amygdalina ..	40,000	3	2	0 10 0	20 0 0	Fine strong plants.
" rostrata ..	120,000	3	2	0 10 0	60 0 0	"
" redunca ..	75,000	3	2	0 10 0	37 10 0	"
" resinifera ..	27,000	3	2	0 10 0	13 10 0	"
" Stuartiana ..	60,000	3	2	0 10 0	30 0 0	"
Quercus suber	432	5	850 seeds	12 10 0	5 8 0	Planted *in situ*, and doing remarkably well.
Totals	522,062	..	..	..	718 15 3	

SCHEDULE 2.—Details of Two-year-old Trees, grown 1907–8. (Fourth Crop.)

Name.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Podocarpus totara	222,560	18	4 5 0	945 17 6	Excellent growth.
" dacrydioides ..	1,840	12	1 10 0	2 15 0	Good strong trees.
Juniperus Virginiana	420	18	3 0 0	1 5 3	" "
Sequoia sempervirens	88	15	6 0 0	0 10 6	" "
Phormium tenax	530	18	3 0 0	1 12 0	" strong plants.
Cordyline Australis	460	18	1 0 0	0 9 0	" "
Totals	225,898	..	..	952 9 3	

SCHEDULE 3.—Details of Three-year-old Trees, grown 1907–8.

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Picea sitchensis	13,350	7	3 5 0	43 7 9	Medium growth.
Varieties Japanese shrubs	100	4	6 0 0	0 12 0	Have done well.
Totals	13,450	..	..	43 19 9	
Pseudo-tsuga taxifolia	3,000	..	3 5 0	9 15 0	All dead.

SCHEDULE 4.—Details of Trees transferred from Ruatangata Nursery to Puhipuhi Plantation, 1907–8.

Name of Tree.	Number.	Value per Thousand.	Total Value.	Remarks.
		£ s. d.	£ s. d.	
Podocarpus totara..	170,400	4 5 0	724 4 0	Medium growth.
" dacrydioides	1,730	1 10 0	2 12 0	"
Picea sitchensis	30,650	2 10 0	76 12 6	Doing well.
Pseudo-tsuga taxifolia	35,500	2 10 0	88 15 0	All died.
Hikora ovata	2,575	4 10 0	11 11 9	Fairly well.
Juglans nigra	4,940	4 10 0	22 4 6	Doing very poorly.
Sequoia sempervirens	765	4 0 0	3 1 3	Doing very well.
" gigantea	330	2 0 0	0 13 6	"
Fraxinus Americana	20	2 0 0	0 0 10	"
Eucalyptus amygdalina	50,800	1 10 0	76 4 0	Have not taken well.
" obliqua	15,650	1 10 0	23 9 6	"
" rostrata	48,000	1 10 0	72 0 0	Doing very well.
" resinifera	46,040	1 10 0	69 1 2	"
" reduncа	10,400	1 10 0	15 12 0	"
" Stuartiana	72,990	1 10 0	109 9 8	Doing exceedingly well.
	490,790	..	1,295 11 8	
Juglans nigra	5,382	3 0 0	16 2 9	Planted *in situ*.
Four tons chaff	..	£6 per ton	24 0 0	Sent to Rotorua.
Totals	496,172	..	1,335 14 5	

A. GORDON,
Nurseryman in Charge.

STARBOROUGH NURSERY.

(Area, 148 acres; altitude, 100 ft.)

Rain fell on 104 days during the year, the rainfall—17·32 in.—being the lowest ever recorded at this station. The maximum monthly fall was in April, when 2·67 in. fell.

The maximum shade temperature registered was 94°, on the 29th January; the minimum, 26°, on the 14th June and the 24th July. Frost occurred on fifty-seven nights during the year.

During the first six months of the year there was a good average rainfall, but from the beginning of October a severe drought set in, lasting till the end of February, the rainfall for those months being only 1·95 in. Though scarcely any death-rate from this cause is noticeable among the nursery stock, shelter-belts and shrubberies have suffered very much, and a glance at these, where a great number of trees 10 ft. and 12 ft. high have succumbed, is convincing proof of the severity

of the past drought. *Pinus radiata, Larix Europæa, Pyrus aucuparia, Betula alba, Chamacyparis Lawsoniana, Griselinia littoralis,* pittosporums, and retinosporas are a few of the varieties that have suffered most.

No seeds were sown this year, and all seed-raising frames were transferred to Rotorua and Ruatangata Nurseries.

Lining-out operations were commenced on the 5th August, and completed on the 23rd September; a total of 933,000 trees being transplanted on to 9 acres at a cost of 2s. 6¾d. per thousand. The grub *Odontria Zealandia* has been very destructive again this year, the area affected being about one acre. The losses from this cause among *Pinus Larix, P. ponderosa, P. Benthamiana, P. strobus,* and *Pseudo-tsuga taxifolia* are estimated at 100,000. All varieties otherwise have done remarkably well, the *Pinus Austriaca* being a fine hardy line of stuff.

During the year 559,840 trees, valued at £1,183 19s. 5d., were sent to the following plantations, nurseries, &c.: Dumgree Plantation, 494,690; Tapanui Nursery, 64,500; Ward School, 650. (For details, see Schedule 3.) The total number sent out since the initiation of the nursery is 2,483,690, valued at £5,297 15s. 11d.

Trees of all ages in the nursery total 739,600, valued at £1,634 16s. (see Schedules 1 and 2); and the total number grown since the inception of the nursery is 3,223,290, valued at £6,918 8s. 11d.

The expenditure for the year was £1,058 1s. 9d., and the total to the 31st March, 1908, £8,689 1s. 2d.

The value of trees, improvements, &c., for the year is £3,569 16s. 7d., and the total to the 31st March, 1908, £8,102 14s. 9d.

For horse-feed, 45 acres of oats were grown. The quantity and quality were not so good as in other years, owing to the dryness of the season, the estimated yield being 45 tons, valued at £157 10s. So that a larger quantity of horse-feed could be grown in the future, 44 acres were resumed by the Department in July. To enclose this area, 13½ chains of fencing was erected, and 10¾ chains purchased from the late lessee at a total cost of £10 11s.

Two foals were bred during the year, but one of them unfortunately died.

The daily average number of men employed during the year was 6·3.

Schedules of trees, &c., and details of values and expenditure are appended.

The following is a record of rainfall and temperature for the year :—

Month.	Rainfall.	Number of Days Rain fell.	Highest Reading of Thermometer.	Date.	Lowest Reading of Thermometer.	Date.
1907.	Inches.		Degrees.		Degrees.	
April ...	2·67	15	79	14th	35	28th, 29th
May ...	2·61	7	67	4th	29	12th
June ...	2·10	10	63	10th	26	14th
July ...	0·88	8	62	1st, 13th	26	24th
August ...	2·66	14	65	28th	27	3rd, 20th
September ...	2·40	13	69	23rd	27	13th
October ...	0·90	11	73	27th	28	15th
November ...	0·28	5	80	25th	35	1st
December ...	0·74	4	92	17th	40	2nd, 3rd
1908.						
January ...	0·02	2	94	29th	40	17th
February ...	0·01	1	86	16th, 29th	39	26th
March ...	2·05	14	86	1st, 11th	39	15th
Totals ...	17·32	104	...	...	...	...

Statement of Expenditure.

	£	s.	d.
Amount at 31st March, 1907 ...	7,630	19	5
Tree-growing ...	578	12	8
General maintenance and repairs ...	92	0	5
Nursery-formation ...	4	15	5
Horse-feed purchased and grown ...	84	15	6
Tools, implements, &c. ...	25	13	3
Fencing ...	10	11	0
Miscellaneous works ...	104	0	6
Proportion of Nurseryman's salary ...	135	0	0
Supervision ...	22	13	0
Total to date ...	£8,689	1	2

Value of Stock.

	£ s. d.	£ s. d.	£ s. d.
Amount at 31st March, 1907		6,712 9 2	
Less value of trees	2,054 11 0		
" horse-feed in stock...	125 0 0		
		2,179 11 0	
			4,532 18 2
Trees, as per Schedule 1			1,450 4 0
" " 2			184 12 0
" " 3			1,486 7 11
Tools, implements, &c.			25 13 3
Nursery-formation			4 15 5
Fencing			10 11 0
Improved value			157 13 0
Horse-feed in stock			220 0 0
Value of young horses bred or increased in value during year ...			30 0 0
			£8,102 14 9

Summary.

	£ s. d.
Value of present stock and general improvements	8,102 14 9
Value of trees sent out since initiation of nursery	5,297 15 11
	13,400 10 8
Expenditure to date	8,689 1 2
Credit balance	£4,711 9 6

Stock in Hand.

SCHEDULE 1.—Details of Two-year-old Trees, grown 1906–7. (Sixth Crop.)

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Larix Europæa	113,000	10–15	2 5 0	254 5 0	Good plants. About 25 per cent. of what was lined out killed by grub.
Robinia pseudo-acacia	61,000	12–24	1 0 0	61 0 0	Growth not so strong as in previous years.
Pinus Austriaca	71,000	4–6	2 5 0	159 15 0	Excellent stuff.
" Laricio	430,000	3–5	2 5 0	967 10 0	Very good.
" ponderosa..	2,200	4–6	2 5 0	4 19 0	Good plants, but a number were killed by the grub.
" ponderosa, var. Benthamiana	1,100	4–6	2 10 0	2 15 0	
Totals	678,300	..	..	1,450 4 0	

SCHEDULE 2.—Three-year-old Trees, grown 1905–6. (Fifth Crop.)

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Tot Value.	Remarks.
			£ s. d.	£ s. d.	
Pinus Laricio	43,000	8–12	3 0 0	129 0 0	Good hardy plants.
" ponderosa	1,500	4–6	3 0 0	4 10 0	Poor.
" ponderosa, var. Benthamiana ..	2,500	4–6	3 5 0	8 2 6	"
Larix Europæa	14,000	12–18	3 0 0	42 0 0	Very good.
Picea sitchensis	200	6–8	3 5 0	0 13 0	Medium growth.
Pseudo-tsuga taxifolia	100	6–8	3 5 0	0 6 6	"
Totals	61,300	..	..	184 12 0	

6. A Mixed-age Crop, Rotorua Nursery

7. A Full-grown Crop in the Whakarewarewa Plantation.

SCHEDULE 3.—Trees, &c., transferred from Starborough Nursery to Plantations, Nurseries, &c., 1907–8.

Where sent.	Name of Tree.	Number of Trees.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Dumgree Plantation	Larix Europæa ..	187,825	2 5 0	422 12 1	All did well for two months after planting, but during the months November to February nearly all died owing to the drought, scarcely 10 per cent. being alive.
	Pinus Austriaca (3 years)	17,875	3 0 0	53 12 6	
	" Austriaca ..	19,450	2 5 0	43 15 3	
	" ponderosa (3 years)	20,500	3 0 0	61 10 0	
	" ponderosa ..	26,650	2 5 0	59 19 3	
	" ponderosa, var. Benthamiana	25,000	2 10 0	62 10 0	
	" Laricio ..	108,650	2 5 0	244 9 3	
	" muricata ..	5,100	2 5 0	11 9 6	
	" contorta ..	1,125	2 5 0	2 10 7	
	" Torreyana ..	240	2 10 0	0 12 0	
	Robinia pseudo-acacia ..	82,275	1 10 0	123 8 3	
		494,690	..	1,086 8 8	
Tapanui Nursery	Larix Europæa (2 years)	20,500	2 5 0	46 2 6	
	" " (1 year)	44,000	1 0 0	44 0 0	
		64,500	..	90 2 6	
Ward School, Flaxbourne	Pinus muricata ..	650	2 5 0	1 9 3	
	Cost of planting same ..	..	..	5 19 0	
		..	..	7 8 3	
Rotorua Nursery	Two light horses, £25, £20	..	..	45 0 0	
	200 seed-frames, at 19s. 10d.	..	..	198 6 8	
	910 ft. piping, at 3½d. ..	..	..	13 5 5	
	45 pipe-fittings ..	..	..	3 4 7	
				259 16 8	
Ruatangata Nursery	Iron and netting for 52 seed-frames.. ..	..	..	40 16 1	
	400 ft. piping, at 3½d. ..	..	..	5 16 8	
	30 pipe-fittings ..	..	..	1 18 1	
				48 10 10	
Dumgree Plantation ..	As per details above ..	494,690	..	1,086 8 8	
Tapanui Nursery ..	" ..	64,500	..	90 2 6	
Ward School ..	" ..	650	..	7 8 3	
Rotorua Nursery ..	" ..	..	..	259 16 8	
Ruatangata Nursery ..	" ..	..	..	48 10 10	
	Totals ..	559,840	..	1,492 6 11	

W. CROMB,
Nurseryman in Charge.

TAPANUI NURSERY.

(Area, 120 acres, altitude, 500 ft.)

Rain fell on 127 days, with a total fall of 25·91 in., the maximum monthly fall being 3·54 in., in February.

The highest shade temperature recorded was 92°, on the 23rd January, and the lowest 24°, on the 29th July and the 13th August.

The unusually dry weather experienced during the year may be gauged from the fact that for the past nine years an average annual rainfall of 38·94 in. has been recorded locally, and springs and creeks from which this station directly obtains its water-supply again ceased running for a prolonged interval.

Towards midsummer the watering of seedlings became a difficult problem, and finally it was necessary to convey water from a stream half a mile distant. Arrangements for the extension of our water-service are now well in hand, and future difficulty in obtaining a supply is not anticipated.

Reviewing the past season's work, it is most encouraging to report the excellent results attending tree-growing operations at this nursery. Hardwood-seed sowing was carried on in May, when small quantities of oak, ash, and sycamore were sown under favourable conditions. The result was satisfactory, as may be seen on reference to Schedule 1, although the ash-seed, through being insufficiently matured when gathered, showed little signs of vitality on being taken from the pit, and consequently this crop was a partial failure. A trial sowing of 14 lb. of *Fagus sylvatica* produced 3,500 sturdy trees, which have since made good headway. Fine results were obtained from the year's conifer-seed-sowing operations, which were commenced on the 19th October, and continued for eight days. The estimated number of seedlings raised is 3,037,000, or more than two and a half times the number grown in any previous year.

From 260 lb. of seed over two millions of finely developed larch-plants have been raised, and a very large proportion of these are sufficiently advanced for transplanting to nursery lines, whilst the remainder could be "lined in close" with every prospect of success.

The crop of pines is also an exceedingly fine one, over three-quarters of a million *Laricio* alone being raised from 135 lb. weight of seed.

The success of the seedling-crop is partly attributed to the use of scrim in covering frames, but it must be remembered that in the great majority of our seasons here neither shade nor application of water is required to any great extent, although there is not the slightest doubt that shelter for the seeds after sowing is one of the chief factors in bringing about speedy germination.

A mild dry spring enabled the transplanting of seedlings to nursery lines to be carried out more expeditiously than usual, and, in consequence, the young plants received the full benefit of early rains. The long spell of dry weather following was not conducive to vigorous tree-growth, but by constantly stirring the soil with machine hoes moisture was conveyed a few inches below the surface, which allowed all classes of stock to withstand the partial drought.

Towards the latter part of summer copious falls of rain occurred, resulting in excellent tree-growth being made generally, and probably no better trees for permanent transplanting have been raised at this station since its initiation.

Lining-out of one- and two-year-old seedlings was commenced on the 15th August, and completed on the 17th October, and during that period 982,400 trees were put out into lines at 2s. 7d. per thousand. 250,000 smaller plants were also lined in closely at a cost of 1s. 10d. per thousand, making a total of 1,232,400 seedlings transferred from seed-beds to nursery lines.

Whilst lining-out was in progress, a lad was engaged in following up the plough and destroying all grass-grubs visible, and in this way thousands of these destructive insects were exterminated. The effectiveness of the method is distinctly apparent, as only on one "break" of larch is there any indication of the pest, and damage is only slight.

The total number of trees of all ages in the nursery is 4,403,960, representing a value of £6,738 19s. 9d.

Lifting, sizing, and bundling were carried on continuously during the winter months, when 741,560 trees, valued at £2,214 14s. 7d., were transferred to plantations as per Schedule 4.

The total number of trees sent out since the initiation of the nursery is 5,573,623, valued at £17,948 16s. 3d.; and the number of trees grown at the nursery since its inception is 9,668,048, valued at £24,201 13s. 10d.

63,260 one- and two-year-old trees arrived safely from Kurow Nursery, and were lined out. A large number of these have succeeded, but trees raised locally make better headway than those received from other districts.

Buildings, Improvements.—Considerable progress was made during the year with the work of formation and general improvements of nursery, and horse-paddocks that previously have not been of much value as grazing-areas are gradually being converted into useful pastures.

Two swampy areas were cleared of stumps, drained, and ploughed, and on being sown in oats yielded very satisfactory returns. Attention is now being directed to another adjoining block of about 12 acres, which will be put down in grass after a crop of oats has been taken from same.

The extension of shelter and ornamental plantations is being slowly continued, and about three hundred various trees were permanently planted. The shelter-belts about nursery have made excellent progress this year, and have already reached a sufficient height in places to intercept to a great extent the prevailing south winds frequently experienced.

About 14 chains of roads in the lower portion of the nursery were graded and sown down in grass, and a sufficiently strong sole has been formed to allow of the continuance of vehicular traffic over same.

Two rooms were added to the Nurseryman's cottage, and the addition, besides greatly enhancing the appearance and value of the property, is much appreciated by the occupants of the house.

The flower-borders and portion of shrubbery were grassed, and beds of various shapes formed on both sides of the approach to buildings.

Owing to the increased amount of horse-work at local stations, two of our three-year-old fillies have been broken in, but more stabling accommodation is urgently needed if these additional animals are to be worked during the winter.

A roomy shed is also required, as at present there is no covering available for the wagon, and exposure to all weathers quickly depreciates any vehicle.

Owing to shortage of water-supply for nursery purposes, arrangements are now in hand for supplementing same, and efforts are being made to discover what volume of water could be derived from shafts put down within the nursery enclosure.

The average number of persons employed during the year was 13·5.

About 26 tons of oaten sheaves were harvested from 18 acres, and two stacks of rye and clover, amounting to about 8 tons, taken from 3 acres. The carrot-crop is not so successful as in former years, but probably 2½ tons of this winter horse-feed will be harvested. The value of horse-feed grown during the year is £93 10s.

It is pleasing to place on record the increased interest taken in the work of the Department by the staff, to whom much of the success of the year's local operations is due.

The expenditure for the year amounts to £1,860 9s. 5d., and total expenditure since initiation is £15,245 17s. 1d.

The value of stock, improvements, &c., for the year is £7,430 7s. 4d., and total values to date is £14,170 3s. 3d.

For the coming year arrangements are being made at the local plantations to receive about 820,000 trees, which are available at this station.

The following is a record of the rainfall and temperature for the year :—

Month.	Rainfall.	Number of Days Rain fell.	Highest Reading of Thermometer.	Date.	Lowest Reading of Thermometer.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	0·99	5	77	14th	31	30th
May	3·44	14	63	6th	28	27th
June	1·42	12	58	2nd	25	20th
July	1·31	11	61	6th	24	29th
August	3·42	12	62	20th	24	13th
September	2·54	13	60	25th	25	16th
October	3·32	13	79	31st	27	16th
November	1·13	6	81	8th	40	19th
December	2·32	11	86	27th	40	12th
1908.						
January	1·13	6	92	23rd	37	17th
February	3·54	9	90	9th	35	17th
March...	1·35	15	84	10th	37	27th
Totals	25·91	127	...	...	...	...

Statement of Accounts.

Expenditure.

	£	s.	d.
Amount at the 31st March, 1907	13,385	7	8
Tree-growing	1,024	16	1
General maintenance and repairs	71	10	11
Nursery-formation	40	12	2
Horse-feed purchased and grown	80	16	0
Manures	24	14	3
Tree-seeds	93	3	11
Tools, implements, &c.	86	11	9
Seed-frames	123	15	0
Buildings, additions to cottage and workmen's quarters ...	123	1	10
Fencing	12	13	10
Miscellaneous works	1	5	8
Proportion of nurseryman's salary	150	0	0
Supervision	27	8	0
	£15,245	17	1

Values of Stock.

	£	s.	d.	£	s.	d.	£	s.	d.
Amount at the 31st March, 1907				11,883	15	8			
Less value of trees at 31st March, 1907	4,971	3	6						
Ditto horse-feed in stock at 31st March, 1907	104	15	0						
" tools written off during year	68	1	3						
				5,143	19	9			
							6,739	15	11
Trees, as per Schedule 1							3,016	5	0
" " 2							549	6	2
" " 3							3,173	8	7
Tools and implements							86	11	9
Seed-frames							123	15	0
Nursery-formation							40	12	2
Fencing							12	13	10
Buildings							123	1	10
Improved value							177	8	0
Horse-feed in stock							102	8	0
Value of young horses bred, or increased value, during year ...							25	0	0
							£14,170	6	3

Summary.

	£	s.	d.
Value of present stock and general improvements	14,170	3	3
Value of trees sent out since initiation of nursery	17,948	16	3
	32,118	19	6
Expenditure to date	15,245	17	1
Credit balance	£16,873	2	5

Stock in Hand.

SCHEDULE 1.—Details of One-year-old Trees, grown 1907–8. (Eleventh Crop.)

Name of Tree.	Number in Seed-beds.	Height in Inches.	Seed sown.	Value per Thousand.	Total Value.	Remarks.
			Lb.	£ s. d.	£ s. d.	
Larix Europæa	2,000,000	2–5	260	1 0 0	2,000 0 0	Exceedingly fine crop.
Pinus Laricio	750,000	1½	135	1 0 0	750 0 0	Excellent results.
„ ponderosa	52,000	1½	10	1 0 0	52 0 0	Strong plants.
„ Benthamiana	35,000	1½	25	1 5 0	43 15 0	„
Pseudo-tsuga taxifolia	34,000	1	10	1 5 0	42 10 0	Only fair.
Picea sitchensis	2,000	1	5	1 5 0	2 10 0	Germinated poorly.
Fraxinus excelsior	7,000	3	3 sacks	1 0 0	7 0 0	„
Acer pseudo-platanus	55,000	8	2 sacks	0 10 0	27 10 0	Good results.
Betula alba	10,000	2	20	1 0 0	10 0 0	Germinated well.
Alnus glutinosa	52,000	3	10	0 15 0	39 0 0	Sturdy plants.
Quercus pedunculata	36,000	7	2 sacks	1 0 0	36 0 0	Strong growth.
Fagus sylvatica	3,500	6	14	1 10 0	5 5 0	Very satisfactory results.
Pyrus aucuparia	500	3	2	1 10 0	0 15 0	Germinated poorly.
Totals..	3,037,000	..	..	..	3,016 5 0	

SCHEDULE 2.—Two-year-old Trees, grown 1906–7. (Tenth Crop.)

Name of Tree.	Number in Seed-beds.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
				£ s. d.	£ s. d.	
Pinus Austriaca	55,800	..	5	1 5 0	69 15 0	Very strong fibrous-rooted plants.
„ Laricio	107,000	13,000	4½	2 5 0	163 0 0	Ditto.
„ ponderosa	900	..	6	1 5 0	1 2 6	Satisfactory results.
„ Benthamiana	3,740	..	6	1 10 0	5 12 2	„
„ Jeffreyii	350	..	6	1 10 0	0 10 6	„
„ Torreyana	400	..	6	1 10 0	0 12 0	„
Fraxinus excelsior	6,000	..	15	1 5 0	7 10 0	„
Betula alba	..	59,500	15	2 5 0	133 17 6	Strong growth.
Alnus glutinosa	..	7,500	9	2 0 0	15 0 0	Fine plants.
Quercus pedunculata	..	49,000	12	2 5 0	110 5 0	Average growth.
Acer pseudo-platanus	..	28,050	24	1 10 0	42 1 6	Unusually strong.
Totals	174,190	157,050	..	..	549 6 2	
	331,240					

SCHEDULE 3.—Three-year-old Trees, grown 1905–6. (Ninth Crop.)

Name of Tree.	Number in Nursery Lines.	Height in Inches.	Value per Thousand.	Total Value.	Remarks.
			£ s. d.	£ s. d.	
Larix Europæa	146,250	15	3 0 0	438 15 0	Strong growth; grass-grub destroyed many.
Pinus Austriaca	40,000	5	3 0 0	120 0 0	Extra strong trees.
„ Laricio	141,000	5	3 0 0	423 0 0	„
„ ponderosa	59,500	5	3 0 0	178 10 0	„
„ Benthamiana	18,500	5	3 5 0	60 2 6	„
„ muricata	3,250	8	3 0 0	9 15 0	„
„ strobus	50	6	3 0 0	0 3 0	Medium growth.
„ Jeffreyii	50	7	3 5 0	0 3 3	Strong and healthy.
Picea excelsa	365,000	8	3 0 0	1,095 0 0	„
„ sitchensis	220,000	10	3 5 0	715 0 0	„
Pseudo-tsuga taxifolia	27,500	10	3 5 0	89 7 6	„
Acer saccharum	2,000	4	3 0 0	6 0 0	Not suitable here.
„ pseudo-platanus	1,000	4	2 15 0	2 15 0	
Fraxinus Americanus	1,600	9	3 0 0	4 16 0	
„ excelsior	3,800	16	3 0 0	11 8 0	These are all well-rooted trees, and unusually strong.
Quercus pedunculata	4,500	12	3 0 0	13 10 0	
Betula alba	1,500	16	3 0 0	4 10 0	
Robinia pseudo-acacia	100	27	2 10 0	0 5 0	
Fagus sylvatica	120	10	3 10 0	0 8 4	
Totals	1,035,720	..	..	3,173 8 7	

SCHEDULE 4.—Trees transferred from Tapanui Nursery to Plantations, &c., 1907–8.

Where sent.	Name of Tree.	Number.	Height in Inches	Value per Thousand.	Total Value.	Remarks.
				£ s. d.	£ s. d.	
Conical Hills Plantation	Pinus Austriaca	22,875	12	3 0 0	68 12 6	These trees, with few exceptions, have done well.
	" Laricio	54,575	10	3 0 0	163 14 6	
	" ponderosa	27,675	10	3 0 0	83 0 6	
	" Benthamiana ..	9,250	12	3 5 0	30 1 3	
	" muricata	4,500	15	3 0 0	13 10 0	
	Picea excelsa	62,675	10	3 0 0	188 0 6	
	Larix Europæa	119,950	15	3 0 0	359 17 0	
	Quercus pedunculata ..	2,500	12	3 0 0	7 10 0	
	Acer pseudo-platanus ..	27,450	15	2 15 0	75 9 9	
	Betula alba	2,000	18	3 0 0	6 0 0	
	Populus (vars.)	2,750	15	1 10 0	4 2 6	
		336,200			999 18 6	
Dusky Hill Plantation	Pinus Austriaca	16,800	12	3 0 0	50 8 0	Notwithstanding the dry weather during the early part of the season, a good result has been obtained.
	" ponderosa	9,050	10	3 0 0	27 3 0	
	" Laricio	51,275	12	3 0 0	153 16 6	
	" muricata	3,500	14	3 0 0	10 10 0	
	" Jeffreyii	100	10	3 0 0	0 6 0	
	" strobus	50	10	3 0 0	0 3 0	
	Picea excelsa	25	12	3 0 0	0 1 6	
	" sitchensis	8,050	13	3 5 0	26 3 3	
	Pseudo-tsuga taxifolia ..	35,050	12	3 5 0	113 18 3	
	Larix Europæa	167,000	14	3 0 0	501 0 0	
	Fraxinus excelsior ..	33,450	15	3 0 0	100 7 0	
	" Americanus ..	10,000	12	3 0 0	30 0 0	
	Quercus pedunculata ..	7,275	12	3 0 0	21 16 6	
	Acer pseudo-platanus ..	49,625	15	2 15 0	136 9 4	
	" saccharum	650	12	3 0 0	1 19 0	
	Betula alba	7,025	18	3 0 0	21 1 6	
	Juglans regia	100	14	4 5 0	0 8 6	
	Alnus glutinosa	150	14	3 0 0	0 9 0	
	Robinia pseudo-acacia ..	1,385	16	2 5 0	3 2 3	
	Æsculus hippocastanum ..	25	13	4 0 0	0 2 0	
	Catalpa speciosa.. ..	50	12	2 10 0	0 2 6	
		400,635			1,199 7 1	
Waitahuna Plantation	Pinus muricata	750	10	3 0 0	2 5 0	These trees were used in completing the planting of dredged area.
	Larix Europæa	1,300	15	3 0 0	3 18 6	
	Pseudo-tsuga taxifolia ..	1,000	12	3 5 0	3 5 0	
	Fraxinus excelsior ..	25	12	3 0 0	0 1 6	
	Alnus glutinosa	625	12	3 0 0	1 17 6	
		3,700			11 7 0	
Conical Hills Plantation	As per details above ..	336,200	..	..	999 18 6	
Dusky Hill Plantation	" ..	400,635	..	..	1,199 7 1	
Waitahuna Plantation	" ..	3,700	..	..	11 7 0	
Industrial Schools, Burnham	Forest-trees	300	..	..	1 4 0	
Southland Hospital and Charitable Aid Board	"	725	..	..	2 18 0	
Kurow Nursery ..	Tree-seed	..	..	..	4 7 1	
Eweburn Nursery ..	5 sacks carrots at 4s. ..	..	..	..	1 0 0	
Totals ..	.. .. ..	741,560	..	..	2,220 1 8	

SCHEDULE 5.—Trees, &c., received from other Nurseries, 1907–8.

Received from	Sent to	Name of Tree, &c.	Number.	Value per Thousand.	Total Value.
				£ s. d.	£ s. d.
Starborough Nursery ..	Conical Hills Plantation ..	Larix Europæa ..	34,000	1 0 0	34 0 0
" ..	Dusky Hill Plantation ..	"	20,500	2 5 0	56 2 6
		"	10,000	1 0 0	
Kurow Nursery ..	"	" ..	44,000	1 0 0	44 0 0
		Pinus Laricio ..	28,000	2 5 0	63 0 0
		" Austriaca ..	6,000	2 5 0	13 10 0
		" ponderosa ..	2,000	2 5 0	4 10 0
		" muricata ..	1,500	2 5 0	3 7 6
" ..	Tapanui Nursery ..	" Laricio ..	13,260	1 0 0	13 5 3
		" Austriaca ..	8,500	1 0 0	8 10 0
		" muricata ..	1,500	1 0 0	1 10 0
		Pseudo-tsuga taxifolia ..	2,500	1 5 0	3 2 6
Eweburn Nursery ..	" ..	30 lb. Pinus Laricio seed	..	..	5 15 2
Totals ..	..	..	171,760	..	£250 12 11

R. G. ROBINSON,
Nurseryman in Charge.

Naseby Survey Paddock Plantation, Otago.

(Area, 175 acres; altitude, 1,900 ft.)

During the year trees at the above plantation have made very satisfactory growth, notwithstanding the very dry season.

The best success has been attained by *Pinus Laricio*, *P. ponderosa*, *P. Benthamiana*, and *Larix Europæa*, which have made splendid growth.

Trees to the number of 27,125 were planted out, at an average cost of £1 1s. per thousand.

The area planted still remains at 132½ acres, as the above were used to fill blanks.

During the coming spring this plantation will be completed, and an area on what is known as the Naseby Commonage is proposed to be taken in for further planting.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	1,832	3	5
Tree-planting	29	15	0
Cartage of trees	3	10	0
General upkeep of plantation	106	4	0
Wire netting, freight, and erection	39	12	0
Buildings—workmen's quarters	19	4	0
Tools	1	6	6
Horse-feed purchased	5	15	6
Proportion of Nurseryman's salary	34	0	0
Supervision	2	0	0
	£2,073	10	5

A. W. Roberts,
Nurseryman in Charge.

Gimmerburn Plantation Reserve, near Naseby, Otago.

(Area, 1,200 acres, altitude, 1,200 ft.)

The trees at the above plantation have not done well, owing to the prolonged drought, nearly all this season's planting having died. This is the third successive year of drought experienced at this station, and when the present area is filled further planting will be done elsewhere.

An area of 105 acres was sown down in oats, but the crop turned out very poorly, there being only 56 tons of sheaves.

An area of 20 acres of self-sown oats was cut, the yield being 14 tons, also twenty sacks of oats were got by stripping. Oats and sheaf to the value of £36 10s. 10d. were transferred to nurseries, and the value of oats in stock is £165 10s. 10d.

The number of trees planted during the year was 250,800, but of this number 178,800 blanks had to be replaced.

The area covered to date is 173¼ acres, and the area for the past season is 26½ acres.

The cost of planting and digging (half-pits) was 16s. 7d. per thousand.

The average number of hands employed was 3·27 (wages).

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	1,605	5	5
Tree-planting	216	15	4
Cartage	13	13	0
General upkeep of plantation	94	15	6
Horse-feed purchased and grown	31	6	6
Miscellaneous works	0	18	6
Salaries, Nurseryman's proportion of, and travelling-expenses	33	0	0
Supervision	4	0	0
	£1,999	14	3

A. W. Roberts,
Nurseryman in Charge.

Dusky Hill Plantation, Otago.

(Area, 845 acres; altitude, 400 ft. to 800 ft.)

Tree-planting on this area last season was completed at an early date under excellent conditions, but during the two ensuing months rainfall was extremely limited, and, although established trees gave little signs of cessation of progress, much concern was felt for the result of the year's planting. Copious rains, however, fell at a critical time, and no traces of the partial drought are now noticeable beyond a few failures in the bar-planting blocks.

235,885 trees were planted in grubber-pits by day-labour, at 12s. 5½d. per thousand, and 239,250 put in by the bar method at 8s. 1¾d.

The amount of ground planted for the year is 174½ acres, and the total area under trees at present is 505½ acres, containing 1,276,167 trees.

The new wagon, which proved to be of a most desirable type, rendered transference of trees from Tapanui Nursery an easy matter, and during the winter months twenty-two trips were made. An expenditure of £9 19s. 3d. was incurred in railage of trees from Starborough Nursery, making a total carriage-cost of £25 19s. 3d.

549,079 grubber-pits were prepared by day-labour at 15s. 9¼d. per thousand, and 502,681 scuffled spots for bar planting at 8s. 9¼d.

42,570 pits remained over after last season's planting, and this number has since been increased to 614,074.

Clearing: A considerable amount of time was devoted to the cutting-down and burning of trees destroyed by the late fire, to enable continuance of pitting operations; but the expenditure in this direction should be a small item next year, as clearing of the burnt-out block is nearing completion.

During April of last year 230 chains of fire-breaks, averaging 100 ft. wide, were formed on leading ridges, and, although an area of about 38 acres is in this way practically rendered idle, these barriers to any encroaching fires are necessary if tree-planting operations are to be conducted with any degree of safety.

The whole of the breaks were disked and harrowed in February last, and future cultivation of same should be more easily carried on.

To further minimise the risk of any fire spreading from neighbouring areas to the plantation, a track about 8 ft. wide was scuffled by hand around boundary-fence line. The Pomahaka River reserve, however, is still the chief cause of uneasiness amongst those immediately connected with this station, as rocky faces, studded with tussocks and native bush, prohibit the formation of fire-breaks on this side, and the public have free access to the bordering reserve for the whole length of the plantation.

Greater facilities being required for the distribution of trees to planters, about 20 chains of zigzag bridle-track, 6 ft. wide, were formed up one of the main spurs, at 3s. 6d. per chain.

Formerly it was the custom for employees to provide their own accommodation here, but tent-life in winter-time has many disadvantages, and the erection of four huts, each 18 ft. by 12 ft., was hailed with pleasure by employees, who lost no time in shifting into their new quarters.

No paddock being available for horses, a number of sound posts and second-hand wire were carted from old boundary-fence at Conical Hills and utilised in the erection of 35 chains of fence, at 2s. 8½d. per chain, which encloses a handy paddock of about 3 acres.

The general tree-growth throughout may be regarded as unusually satisfactory, although on the drier, shingly situations the want of moisture was acutely felt for a short period. As in previous years, the larch are growing with considerably greater speed than other trees put out, and many of this species have added fully 3 ft. to their height. Success is also assured with the Picea family, which, after years of inactivity, commenced to put on healthy wood, and have since developed into robust-looking specimens generally. A fair average growth has been maintained by the various pines, although this class of tree succeeds to a greater degree locally during a wet season. It is pleasing to record the rapid development in sheltered sites of the deciduous trees that were cut back to ground-surface immediately after partial destruction by fire. Ash, oak, and sycamore have in most cases made exceptionally fine progress, and average about 5 ft. high after two seasons' growth.

Good results were anticipated some years ago in direct planting of acorns to steep hillsides, but up to the present this system has proved a failure, and these acorn blocks are now being converted into larch areas by the bar-planting process. In nearly every case the acorns germinate excellently, and reach a height of from 6 in. to 9 in. before the end of the first season, but the progress of the young oaks become less pronounced with each succeeding year. It may thus be seen that, for the successful raising of oak forest locally, transplanting from nursery to sheltered permanent sites is essential.

Maintenance: Clearing of strong growth from around young trees necessitated a good deal of labour, but work in this direction should gradually become a small item.

The spring frosts were not sufficiently severe to injure leaders of young trees, and consequently pruning operations were much reduced. A number of the older trees, however, required attention, and for this purpose three long-handled pruners were secured.

The expenditure for the year amounted to £1,715 0s. 4d., giving employment to a daily average of 15·4 men. The total expenditure since initiation is £10,314 9s. 5d.

One mare and harness, valued at £47 7s. 3d., was transferred from Kurow Nursery, and debited against this plantation account. Forty-four thousand trees were received from Kurow Nursery, and 30,500 trees, as per Schedule 5, were also received from Starborough Nursery, and included under the planting records.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	8,599	9	1
Pitting—			
549,079 grubber-pits	432	9	8
502,681 scuffled spots	220	17	10
Tree-planting (475,135)	274	10	10
Clearing	60	14	8
Cartage of trees	25	19	3
General upkeep of plantation	150	2	7
Horse-feed purchased and grown	10	0	0
Fencing	4	14	5
Buildings	240	5	8
Tools, implements, &c.	62	17	1
Miscellaneous works	45	5	4
Forester's salary, supervision of free labour	136	1	0
Nurseryman's proportion of salary, and travelling-expenses	27	0	0
Supervision	24	2	0
	£10,314	9	5

F. BENFELL, Assistant Forester.
R. G. ROBINSON, Nurseryman in Charge.

Conical Hills Plantation, near Tapanui, Otago.

(Area, 3,672 acres; altitude, 400 ft. to 1,050 ft.)

As recorded at other local stations, the rainfall for the past year was very limited here, but the shortage of moisture was not so noticeable as in the previous year, owing to excellent rains thoroughly saturating the subsoil in early spring.

370,200 trees, as per Schedules 4 and 5, were carted from Tapanui in fourteen wagon-loads, and planted by day-labour at 11s. 5½d. per thousand, over an area of 136 acres. The total area now under forest-trees at this plantation is 1,082 acres, containing 3,313,579 trees.

259,375 pits were prepared by contract, at £1 per thousand, and 85,267 scuffled spots made for bar planting, at 12s. 4⅛d. per thousand.

At the end of the planting season 5,000 pits remained, and since that date this total has been increased to 266,150.

Clearing: Only a small expenditure was necessary in removing scrub and rushes from area prior to pitting, and, as there are very few scrub patches throughout the extension property, the annual labour in clearing will not be considerable.

Fire-breaks: Three hundred and forty chains of fire-breaks, averaging 90 ft. wide, were ploughed in April last, and some few months later the disc harrows did serviceable work over the same ground. The area in roads and fire-breaks now reaches 60 acres, and, as the planting extends, new barriers to fires must be formed and kept in a state of efficiency.

Fencing: In enclosing the adjoining 2,622 acres a large amount of work was essential. Removal of the old boundary-fence was undertaken by day-labour, and a substantial rabbit-proof structure put up in its place. The erection was satisfactorily performed by contract, at 5s. per chain; but, owing to the dry weather and consequent difficulty in sinking post-holes, the venture did not prove very remunerative to the contractors.

To facilitate the destruction of rabbits and also allow stock to graze area not immediately required for tree-planting purposes, 210 chains of wire-netting was attached to a division-fence at a cost of 1s. 11d. per chain. The block thus enclosed amounts to 960 acres, and should be a sufficient area on which to plant trees grown locally, at the present output, for two years.

Much success has attended tree-growing operations at this station during the past year, and losses in transplanting would probably not reach 5 per cent., although an unusual number of larger-sized larch put out on the higher levels failed to succeed.

It is very gratifying to report the vigorous growth made by the spruce species: these trees formerly caused uneasiness by their failure to make any pronounced headway on exposed situations, but this year, in place of the yellow unhealthy-looking foliage, robust dark-green leaders may be seen.

The pines, without exception, are also a success, although *Pinus Benthamiana* are developing with greater rapidity than other varieties, and promise to succeed in the most varied soils and positions.

The shelter-breaks of *Pinus insignis* and *P. muricata* are quickly attaining the object for which they were planted, and in a few years' time an immense amount of benefit should be derived from same.

The growth of alder on swampy portions of plantation averages about 30 in., or 10 in. in excess of that put on by poplars.

Up to the present it has been the custom to plant ash and sycamore in sheltered places, but the number of trees available necessitates additional planting of both varieties on somewhat exposed situations. The issue in the latter case is unfavourable, as, whilst excellent specimens may be noticed in sheltered gullies, those growing under other conditions have remained stationary, and appear to be bark-bound. By cutting these trees down to ground-surface a strong shoot may be anticipated for the first year, but a gradual development into the former state would undoubtedly ensue.

The climatic and other conditions have again demonstrated their suitability for the successful raising of larch forests—many of this class putting on 30 in. of vertical growth for the season—and it would be to the interests of the Department if this species of tree were substituted for the two aforementioned slow-growing and uncertain varieties.

Rabbiting has latterly been confined to the recently enclosed block, and frequent trapping and poisoning will be necessary to eradicate the pest before trees are received.

General maintenance: Tree-pruning here is not, so far, an expensive item, although occasional labour is required in removing surplus shoots from young trees where more than one leader exists.

The suppression of strong grass from around trees in the early stages was also undertaken, but this labour generally is principally carried on during the second growing season.

The work during the coming year will be almost confined to the extension block, through which it is proposed to run a fire-break on the summit of the leading range for nearly 100 chains in length.

The expenditure for the year amounted to £1,403 16s. 3d., giving employment to 8·5 men, and the total expenditure to date is £9,686 17s. 11d.

Tools, implements, and fencing-material to the value of £181 13s. 3d. were received from Kurow Nursery.

8. In the Eucalypti Plantation, Whakarewarewa.

9. *Eucalypti regnans*, 60 ft. high (8 years old).

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	8,283	1	8
Pitting—			
259,375 grubber-pits	259	7	6
85,267 scuffled spots	52	12	3
Tree-planting (370,200)	212	8	11
Clearing	4	3	1
Cartage of trees	10	0	0
General upkeep of plantation	158	4	3
„ repairs	11	2	6
Horse-feed purchased and grown	10	0	0
Fencing	339	0	3
Tools, implements, &c.	138	5	6
Miscellaneous works	14	16	0
Salaries—			
Supervision of free labour	150	0	0
Nurseryman's proportion of, and travelling-expenses	21	0	0
Supervision	22	16	0
	£9,686	17	11

H. Home, Assistant Forester.
R. G. Robinson, Nurseryman in Charge.

Waitahuna Plantation, Otago.

(Dredged area, 11 acres; altitude, 331 ft.)

This district has not been exempt from the unusually dry season experienced generally throughout the South Island, but, the property being only a few feet above the level of the adjacent river, an abundance of moisture was available for tree-growing, and it is questionable if more satisfactory results could be obtained during any ordinary wet season.

A sufficient number of trees not being in hand last season to plant the whole area, 3,700, as per Schedule 4, were railed from Tapanui Nursery, and planted in pits already prepared, at 12s. 1½d. per thousand.

The planting of this dredged land has been so far purely of an experimental nature, and of the twelve varieties of trees included in the test, it is obvious that certain classes will thrive amazingly well under the conditions.

Of the deciduous trees, English birch, larch, and alder appear to have maintained steady progress since planting, and many of the latter variety have attained a height of fully 5 ft. in two seasons.

The pines are also satisfactory on the whole, although *Pinus Austriaca* and *P. muricata* show up most prominently, and are quite as strong and healthy-looking as those grown under favourable conditions at other plantations.

There is no doubt that good results may also be achieved from the planting of the spruces, although their customary slow growth during the first few years, and consequent expense in keeping gorse and broom in check, would prohibit extensive planting of this species of tree. No reason can be advanced why tree-planting on abandoned dredged areas should not be carried on with excellent results; but if such work is undertaken, it would certainly be more economical to commence operations before gorse and other growths have obtained such a hold of properties, as the suppression of same involves a fairly heavy expenditure, and each succeeding year the scrub becomes more dense and consequently more difficult to eradicate.

An expenditure of £4 2s. 6d. was incurred in grubbing out gorse, which springs up in thousands after the parent stock has been removed, and tends to create irreparable injury to the tender leaders of young trees.

The expenditure for the year amounted to £13 15s. 10d., giving occasional employment to one man, and total expenditure to date is £168 10s. 3d.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	154	14	5
Tree-planting (3,700)	2	5	0
General upkeep of plantation	4	2	6
Miscellaneous works	0	11	10
Nurseryman's proportion of salary, and travelling-expenses	3	16	6
Supervision	3	0	0
	£168	10	3

R. G. Robinson, Nurseryman in Charge.

Waitaki Plantation.

(Area, 728 acres; altitude, 700 ft. to 1,400 ft.)

Work on this plantation ceased in May, the land being required for settlement purposes.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	39	6	1
Formation of plantation-roads	4	13	6
Fencing	319	3	1
Tools, implements, &c.	26	4	3
Miscellaneous works	1	2	6
Nurseryman's proportion of salary, and travelling-expenses ...	8	3	4
	£398	12	9

N. Craig, Nurseryman in Charge.

Hanmer Springs Plantation, Canterbury.

(Approximate area, 1,488 acres; approximate altitude, 1,225 ft.)

Tree-planting operations at this station during the past year have been, on the whole, attended with fairly satisfactory results, although, owing to the very dry summer experienced, the trees have not made such good growth as in previous years. It is estimated that about 5 per cent. of deaths occurred amongst the various species of pines planted, and from 10 to 15 per cent. amongst larch, the deaths in the latter being almost entirely confined to where the trees had been planted on gravelly soil.

The total number of trees planted during the year was 591,400, on an area of 206 acres, and 43,780 trees were utilised to replace blanks in former plantings.

The area planted at this station now comprises 668 acres, containing 1,863,170 trees.

Free Labour.

An average of 3·9 men were employed during the year, and the cost of the various works was as follows: Pitting, 10s. 9¼d. per thousand; tree-planting, 14s. 6¾d. per thousand; clearing round trees, and clearing and cultivating fire-breaks, £139 15s.; formation of new prison camp, £18 3s. 3d.; erection of camp buildings, £28 4s.; erection of wire netting on new plantation-area, cost 2s. per chain.

The clearing of fern and scrub from trees planted in the low-lying portions of plantation and in swamps necessitated a considerable amount of labour being expended, and two men were employed almost constantly at this work during the summer. Some six miles of fire-breaks were ploughed and cultivated round boundary of plantation, and on roads through plantation a considerable amount of labour was necessary to keep growth in check.

During the winter pruning was continued amongst the larger trees, and amongst the larch a considerable amount of work was necessary in removing double leaders.

The planting of blanks was done principally by free labour, the number planted being 43,780 trees.

Prison Labour.

The work done by prisoners during the year was very satisfactory, the average number of prisoners employed daily at forestry-work being ten; the total value of work was £659 15s. 7d., or an average value of £65 19s. 6d. for each of the ten men employed.

The details and values of prisoners' work are as follows: Clearing for tree-planting, 15 acres, £14 8s.; pitting, 183,500 pits, £93 16s. 3d.; tree-planting, 500,725 trees, £245 7s. 4d.; fencing, 40 chains, £8 9s. 9d.; erecting camp buildings, £60 9s. 9d.; forming camp-site, £87 17s. 9d.; general maintenance, £149 6s. 9d.: total, £659 15s. 7d.

A considerable amount of prison labour was necessary in forming site for new camp, erecting prison-camp buildings, repairing and re-erecting prisoners' huts transferred from Dumgree, forming roads to and about camp, and forming kitchen-garden; consequently the amount of work done in connection with actual tree-planting operations was much less than last year.

The camp was shifted to new site during February, and in March a start was made with clearing and pitting for the coming season's tree-planting.

Pitting was commenced with free labour (by contract) during February, and it will be necessary to continue this work during the winter to provide sufficient pits for the number of trees available for planting during the coming planting season.

It is estimated that about a million trees will be available for planting during the coming season, but, unless more prison labour is available for forestry-work, only about half of this number can be planted.

The prison camp has now accommodation for sixty men, but up to the present time the largest number of prisoners in camp has been thirty-five, and the number employed daily at forestry-work has varied from ten to twenty men.

The growth of trees of all ages in the plantation was somewhat retarded by the unfavourable weather-conditions prevailing during the summer months. This was particularly noticeable where the soil is of a gravelly nature, and trees of all species seem to have felt the effects of the drought much more severely on the flats than where planted on the hills.

Pinus Laricio and *Pinus ponderosa* seem to withstand the effects of a prolonged drought much more successfully than the other species planted, and it is intended for the future to confine the planting of larch to the hills and slopes as far as possible, and use the pines for the planting of the flat and drier portions of the plantation-areas.

The expenditure for the year amounted to £1,123 13s. 4d., and the expenditure to date is £4,374 4s. 1d.

Details of expenditure for the year and to date are appended.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	3,250	10	9
Pitting	48	10	9
Tree-planting	66	1	9
Cartage of trees	1	2	6
General upkeep of plantation	159	17	6
Horse-feed purchased and grown	33	19	6
Fencing	138	16	8
Buildings—prison-camp	379	8	0
Tools, implements, &c.	46	5	6
Miscellaneous works	11	19	0
Prison-camp removal	121	19	2
Salaries—			
Supervision of prison labour	2	11	0
Nurseryman's proportion of, and travelling-expenses	85	0	0
Supervision	28	2	0
	£4,374	4	1

T. B. CURLE, Forester in Charge.

DUMGREE PLANTATION.

(Area, 881 acres; altitude, 100 ft.)

The past year has been a very bad one for forestry-work in this locality, and the results at the plantation are far from encouraging. From the effects of the extremely dry weather of the past six months, not only has the last season's planting been a failure, but the plantation all over has suffered severely, and it is estimated that the death-rate over the whole plantation is about 75 per cent. The loss to the Department is to be deplored, and it must also be regretted that the attempt, so far, at afforestation in Marlborough has not been more successful.

Planting was commenced in May and completed early in September, the weather-conditions at that time being all that could be desired. All trees struck well, and up to the end of October everything pointed to the season's work being a success, and it would have been but for the drought that followed.

The total number of trees planted during the year was 494,690. Of this number 266,050 were used to fill up deaths in previous years' planting. It is, however, considered that only about 10 per cent. of what were planted are alive. Among last season's planting no species can be picked out for special mention, all having suffered alike; among previous years' planting, *Pinus ponderosa* and *Robinia pseudo-acacia* have done the best, fewer deaths occurring among these. The last-mentioned are planted on a portion of the stoniest part of the plantation, and it is evident that this tree, when once established, will grow on the poorest soil under very adverse weather-conditions.

The area planted during the year was 84 acres, making a total to date of 469¾ acres, the estimated number of trees alive being 350,000.

Free Labour.

Seven thousand four hundred pits were dug, at a cost of £2 16s. 1d. per thousand; 142,826 blanks were reopened, and 86,075 spots scuffled for bar planting, at a cost of £1 11s. 4d. and 18s. 9d. per thousand respectively.

Tree-planting on new area cost £1 2s. 5d. per thousand, and planting up blanks 19s. 11d.

One hundred and twenty-eight chains of fire-breaks, half a chain wide, were ploughed and cleared, at a total cost of £1 19s. 6d.

Prison Labour.

All works undertaken were done in a creditable manner, which in a large measure is due to the care and attention of the prison officers. The Department having decided that no further planting is to be done at Dumgree, the prison camp was in February transferred to Hanmer Springs Plantation.

The value of the work done for the eleven months was £392 1s., of which the following is a summary: Digging 17,000 pits, £53 10s. 7d.; reopening 47,830 pits, £64 15s. 11d.; scuffling 69,350 spots, £61 2s. 3d.; marking 24,000 pits, £8 19s. 9d.; clearing round trees, £56 7s. 2d.; planting trees, £106 9s. 8d.; clearing 115 chains fire-breaks, £13 5s.; opening trenches for trees, £14 13s. 2d.; miscellaneous works, £12 18s. 1d.

The daily average number of prisoners employed for the eleven months was 11·38, and the daily average of free men for the year 7·70.

The expenditure for the year was £1,065 9s. 11d., and the total to date £9,862 7s. 11d.

Expenditure.	£	s.	d.
Amount at the 31st March, 1907	8,796	18	0
Pitting	20	14	9
Tree-planting	136	9	1
Cartage of trees	15	14	6
General upkeep of plantation	645	12	1
„ repairs	10	7	1
Tools, implements, &c.	16	2	0
Miscellaneous works	22	14	5
Salaries—			
Foresters	145	0	0
Supervision of prison labour (wages of relieving officer) ...	2	19	6
„ free labour	2	2	6
Nurseryman's proportion of, and travelling-expenses ...	30	0	0
Supervision	17	14	0
Total to date	£9,862	7	11

W. G. Morrison, Assistant Forester.
W. Cromb, Nurseryman in Charge.

Whakarewarewa Plantation.

(Approximate area, 8,912 acres; approximate altitude, 1,200 ft.)

During the past season trees to the number of 1,943,990 were dealt with. 1,650,690 were planted on a new area of 650½ acres, and the remainder, 293,300, were used to replace failures in former plantings. The total area planted to date in this reserve is 2,319 acres, containing 5,042,126 trees.

Prison Labour.

The employment of prison labour has again been very successful, and the interest taken in the work by the Prisons Department's officers has been of great assistance in carrying out the work in a creditable and satisfactory manner.

The daily average number of men employed was 15·05, and their work was valued at £1,103 5s. 2d., or an average for the year of £73 6s. 1d. per man, thus showing an increase of £6 19s. 11d. per man on the previous year's results.

The details of work done by prisoners are as follows: Clearing for tree-planting, 70 acres, at £1 per acre, £70; planting 912,695 trees, at 8s. per 1,000, £365 1s. 7d.; formation of fire-breaks, clearing, burning, and stumping 119 chains at 10s. per chain, £59 10s.; road-formation, 30 chains at £1 per chain, and 137 chains at 10s. per chain, £98 10s.; putting in culverts, £3 5s.; draining 12 chains at 5s. per chain, £3; making planting-bags, harness, and tents, £38 11s. 6d.; general upkeep of plantation—planting blanks £151 16s. 4d., improving and repairing roads £139 13s. 3d., grubbing gorse £59 8s. 9d., general repairs and miscellaneous works £114 8s. 9d.: total, £1,103 5s. 2d.

Free Labour.

An average daily number of 23·92 free men were employed, and the cost of the various works undertaken was as follows: Clearing for tree-planting, 16s. 9¼d. per acre; pitting, 9s. 4¼d. per thousand; planting, 7s. 7¾d. per thousand; formation of fire-breaks, 7s. 2½d. per chain; road-formation, side cutting, £1 per chain; and fencing—erecting, clearing line, &c.—cost 14s. 4¾d. per chain.

A considerable difference will be observed in the cost of clearing as compared with the previous year, when the cost per acre was £1 11s. 3¼d., and this is accounted for by the comparatively light nature of the growth on the area cleared during the past season.

All fire-breaks have been kept in a very efficient state by ploughing and cultivating, and in many places too steep to use horses, by cutting and burning growth and hand-hoeing. The length of fire-breaks formed and ploughed is as follows: Formed—179 chains by 1½ chains, 66 chains by ½ chain; ploughed—80 chains by 1½ chains, 70 chains by ½ chain: and the total length cultivated, 680 chains.

With the permission of the Native owners of the land, a fence was erected along the Wairoa Road from the plantation-boundary to Lake Tikitapu, for the purpose of keeping stock from wandering on the reserve. The length of this fence is 121 chains, and, as the growth of fern and tutu was very heavy along the greater part of its length, it was found necessary, in order to have it burned, to clear all the growth between the line and the road, and this was done at a cost of 5s. 3d. per chain, leaving the cost of erecting 9s. 1¾d. per chain. The strip of land cleared along the fence averages fully ½ chain in width, and acts as a serviceable fire-break. Pruning is now being carried on in the older parts of the plantation, and, as a great number of trees now require attention, it will be necessary to keep a small number of men continually at this work.

Free labour was occupied for three months keeping down growth amongst the trees, a sum of £346 13s. 1d. being spent on this work.

Although the summer months have been exceptionally dry, the trees planted during the year have on the whole done very well, larch and Oregon pine in particular having made very good

growth with scarcely a death amongst them. There is no doubt that larch has proved one of the best trees planted out at this station; it is easily transplanted, and has done well in almost any soil and situation, the only thing affecting its growth being unseasonable frosts, of which, however, none have been experienced during the past year. *Pinus Laricio* has made fair growth, although a small number died during the drought, which commenced soon after they were planted. *Sequoia sempervirens* has been rather disappointing, having made little or no growth, but as the season was not very favourable it is hardly possible to judge as to its suitability until a further planting has been made. *Acacia melanoxylon* has, as usual, made splendid growth. Two species of eucalypti only were planted, *Eucalyptus Stuartiana* and *E. amygdalina*. Both have done well in the area planted first, but in the portion planted at the end of the season, when the weather was very dry, a considerable number of deaths have occurred. *E. amygdalina* has made less growth and has hardly stood the drought so well as *E. Stuartiana*, which will probably be found the more suitable species for this locality.

For the coming season preparations are in hand for planting about two million trees.

The work of this plantation is every year receding further from the Rotorua Township, and some difficulty has already been experienced in getting men for the work. The distance from Rotorua is about five miles, and the men have to use either horses or bicycles to get to and from work, the upkeep of which makes a serious inroad upon a daily wage of 7s. Accommodation in the shape of a building for cooking in and storing their food is recommended. This could be built on skids or in sections, and shifted about as required. Tents for the men to sleep in should also be provided, as is done at Waiotapu for the use of discharged prisoners.

A house is urgently required for the Assistant Forester, whose duties necessitate him being almost constantly on the reserve, and there is no house convenient to the plantation which could be rented or leased.

In January last, after a long spell of very dry weather, a fire unfortunately occurred, resulting in the destruction of three thousand eucalypti over an area of about 2½ acres. The trees were two years old, so that the loss, although deplorable, was not very great. As far as could be ascertained, the fire occurred owing to the soil igniting whilst the growth was being burnt off the adjoining fire-break some five days previously, and smouldering until it reached the fern-growth amongst the trees, when it blazed up and was noticed. It is very difficult to detect fire in the soil, as practically no smoke is emitted when it is dust-dry. In burning on the fire-breaks soil was thrown over the ashes and every precaution was taken by the officer in charge at the time to extinguish all fire, so that it was purely an accident.

The question of coping with fire at this plantation is one which should be gone thoroughly into at an early date. At present the boundary of the area planted with trees is, roughly, six miles, and practically only two miles and a half of this is constantly under observation, this portion being the boundary-line adjoining the nursery. Along the Wairoa and Waiotapu Roads, on both of which the traffic is considerable, a fire might occur and burn a large area of plantation before it was noticed. It is recommended that on each of these boundaries a reliable workman should be stationed, and his hut connected by telephone with the nursery, so that in the event of a fire he would perhaps be able to extinguish it before much damage was done, or, if necessary, get assistance in a short space of time. One of the fence-wires might be used for the telephone instead of erecting a separate line. Men stationed at such places could be profitably employed keeping the fences in repair, pruning, and attending to fire-breaks, &c.

It is proposed to start a camp shortly in the Waipa Valley, to offer employment at tree-planting to the convalescent patients from the Cambridge Sanatorium. A suitable spot has been selected by the Chief Health Officer, and six ex-patients will start work early in the year.

Details of expenditure are attached, and the species of trees planted during the year will be found by referring to Schedule 4 appended to Rotorua Nursery report.

Expenditure.

	£	s.	d.
Amount at the 31st March, 1907	10,339	18	1
Pitting	767	4	2
Tree-planting	371	15	9
Clearing	703	6	9
Cartage of trees	98	0	0
General upkeep of plantation	528	3	11
„ repairs	68	3	10
Horse-feed purchased and grown	100	7	0
Fencing	180	13	3
Tools, implements, &c.	64	14	10
Miscellaneous works	4	7	4
Salaries—			
Foresters—1 at £150, 1 at £75 1s. 5d. (6 months)	225	1	6
Supervision of prison labour	75	0	9
„ free labour	150	1	6
Nurseryman's proportion of, and travelling-expenses ...	30	0	0
Clerical assistance (proportion of)	23	12	0
Supervision	36	5	0
	£13,541	13	5

D. J. Buchanan, Assistant Forester.
H. A. Goudie, Nurseryman in Charge.

Waiotapu Plantation.

(Approximate area, 6,700 acres; approximate altitude, 1,200 ft.)

The rainfall for the year amounted to 53·02 in., falling on 117 days; the heaviest monthly fall being recorded in April, with 8·06 in.

The lowest shade temperature was 14° Fahr. or 18° frost on the 3rd August, and the highest shade temperature was 92° Fahr. on the 16th December and the 11th January.

The employment of prison labour continues to give great satisfaction, and much credit is due to the warders for the live interest taken by them in the work, and to the Gaoler for his tactful assistance in causing the work to proceed without allowing the interests of the two Departments to clash.

An average daily number of 38·64 prisoners performed work to the value of £3,878 7s. 6d., or an average value of £100 7s. 5d. per man for the year.

Details of work performed are as follows: Planting 2,221,100 trees, at 7s. 6d. per thousand, £832 18s. 3d.; planting 380,125 trees without pits, at 12s. 6d. per thousand, £237 11s. 7d.; preparing 1,682,900 pits, at 10s. per thousand, £841 9s.; clearing for tree-planting 945 acres, at £1 per acre, £945; clearing fence-line, laying posts on line, and erecting fence—4 miles 6½ chains, £120 17s. 6d.; forming road to new camp, 122 chains, £162 8s. 6d. Shifting prison camp: Grading camp-site and excavating for wash-house, £40 10s.; water-supply, £31 9s.; building, painting, and bricklaying, £53; forming new garden, £22 19s. 6d. Carting trees, £48; general maintenance, £542 4s. 2d. Total value of work, £3,878 7s. 6d.

Tree-planting was commenced on the 27th April, and completed on the 17th September, and during that period trees to the number of 2,859,910 were planted. Of this number 268,680 were used for replacing failures in former plantings, 117,930 being larch used to replace deaths in the area planted with eucalypti some years ago. The area planted with trees during the year amounted to 952 acres, and the plantation now contains 6,932,934 trees, covering an area of 2,728½ acres.

The older trees continue to do well. Oregon pine which were badly frosted a few years ago appear to have recovered, and are making good progress owing to the absence of summer frosts this year and to the shelter now afforded by the nurse-trees, *Pinus Laricio*. The same remarks apply to the Californian redwood, which are now being well protected by the larch nurses planted with them.

On the whole, the results obtained amongst the trees this year are satisfactory, but owing to the exceedingly dry weather which prevailed during the months of January and February the death-rate is somewhat heavier than it has been for the last few years. The greatest losses appear amongst the *Pinus Laricio*, which, under the best conditions, does not as a rule transplant well. This species is generally and correctly recognised as a good drought-resister owing to the strong spreading habit of its root-system, but in the young state our experience is that it does not readily produce secondary roots and root-hairs, and consequently takes a considerable time to recuperate after being transplanted.

Details of trees planted may be seen by referring to Schedule 4 attached to the report on Rotorua Nursery.

The work of pruning through the older portion of the plantation has been considerable during the past year, and of course this work is one that is always increasing and demands prompt and careful attention. It has been found that with a little careful training many of the best-conducted prisoners soon become expert at pruning, and really good work has been performed by them.

The upkeep of the roads and fire-breaks has as usual entailed a good deal of work, and it has been necessary to keep four horses constantly employed during the summer ploughing and cultivating them. To expedite this work two horses were purchased, also a set of disc harrows and a double-furrow plough.

Extension of the plantation-work on the Maungakaramea reserve has progressed well during the year. Seven miles of post-and-wire fencing was erected, with gates where necessary. A road 122 chains long was formed leading to the site to which the prison camp is to be shifted, and the camp-site itself graded in readiness for receiving the huts. A start was made on some of the buildings, also the water-supply, and altogether the preparations are well in hand for shifting camp early in the year.

Tree-planting operations for the coming season will be confined to an area of land situated within a radius of 1½ miles from the new prison-site.

Land has been cleared and preparations are in hand for planting 2½ million trees on this block. Much of the country is very steep and carried a dense growth of fern, and clearing has been rather heavy work. The land, however, is fairly good, and it is proposed to plant it with larch and Californian redwood, as the latter tree prefers good soil and seems to do better on hill-slopes than on the lower-lying flats, which will be reserved for several species of pines.

When the prison camp is shifted it will be necessary to place an officer in charge at the old site in order to suppress fires if they occur, and also to supervise pruning, the replacing of failures, and the planting by free labour at the far end of the block.

Any prisoner wishing to make a fresh start in life when discharged will be offered employment at this place, so that there will probably be no difficulty in getting plenty of labour. Three ex-prisoners have already been given employment, with encouraging results. They understand the work and the requirements of the Department thoroughly, and so far have given no trouble.

Details of expenditure are appended.

Following is a record of rainfall and temperature for the year :—

Month.	Rainfall.	Number of Days Rain fell.	Highest Reading of Thermometer.	Date.	Lowest Reading of Thermometer.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	8·06	12	80	10th	30	27th
May	5·84	10	71	2nd	19	30th
June	2·35	6	68	11th	17	7th and 16th
July	3·27	9	64	5th	15	24th
August	5·49	13	60	9th and 28th	14	3rd
September	4·75	18	66	20th	20	17th
October	6·97	12	76	27th and 29th	24	5th and 29th
November	2·38	9	81	27th	32	29th
December	7·78	8	92	16th	32	26th
1908.						
January	0·04	1	92	11th	28	6th
February	0·79	3	88	18th	30	29th
March	5·30	16	82	3rd	26	15th
Totals	53·02	117	...	...	...	...

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	3,661	19	7
Formation	17	17	8
Clearing (discharged prisoners)	16	0	0
Cartage of trees	73	12	0
General repairs, chiefly material for	52	12	3
Horse-feed purchased and grown	81	13	9
Fencing-material	402	14	7
Buildings, shifting camp, expenditure to date	322	15	4
Tools, implements, &c.	221	9	1
Salaries—			
Foresters—1 at £150, 1 at £120 7s.	270	7	0
Nurseryman's proportion of, and travelling-expenses ...	30	0	0
Clerical assistance	23	12	0
Supervision	35	4	0
	£5,209	17	3

R. MacRae, Assistant Forester.
H. A. Goudie, Nurseryman in Charge.

Kaingaroa Plains Plantations (Four) near Waiotapu.

(Total area, 25 acres; approximate altitude, 2,000 ft.).

These four experimental areas have been worked in conjunction with Waiotapu Plantation by free labour.

Pruning was attended to where necessary, and the fences and fire-breaks kept in order.

The expenditure for the year amounted to £11 2s. 8d., and the expenditure to date is £368 18s. 2d.

Expenditure.

	£	s.	d.
Amount at 31st March, 1907	357	15	6
General upkeep of plantation	1	2	8
Nurseryman's proportion of salary, and travelling-expenses ...	10	0	0
	£368	18	2

R. MacRae, Assistant Forester.
H. A. Goudie, Manager in Charge.

Puhipuhi Plantation.

(Area, 10,000 acres; altitude, 1,000 ft.).

Rain fell on 170 days during the year, with a total fall of 110·12 in., the heaviest fall being recorded in March, when 20·06 in. fell on eighteen days.

Maximum temperature, 88°; minimum temperature, 28°.

Trees to the number of 490,790 were planted, occupying an area of 425 acres. Of this total 33,000 were utilised for blanks. Total planted to date, 918,795 trees; acreage planted to date, 1,125 acres. 5,382 *Juglans nigra* seeds were also planted *in situ*.

The average cost of planting was 11s. 8d. per thousand, as against 17s. 10d. last year. The difference in cost is accounted for by the larger number of eucalypti planted.

Owing to the very bad state of the road between the railway-station and the plantation—a distance of four miles—the cartage of trees was a very expensive item, amounting to £50 1s. 8d.

395,500 pits were opened up, at a total cost of £316 8s., the average cost per thousand being 16s. 23,500 pits were reopened at a cost of 12s. 6d. per thousand. The total number of pits available for this season's planting is 35,400.

A hundred and thirty acres of fern land was burnt off, at a cost of 1s. 4½d. per acre, and 90 acres of dry timber and manuka were felled by contract for 4s. 6d. per acre.

As the fern in this district grows so quickly, it was decided to try cattle as an experiment, to test their suitability as a means of destroying the growth of fern on boundary as a precaution against fires, and for this purpose 160½ chains of fencing was erected 1 chain inside boundary-fence, at a cost of 8s. per chain. A dividing-fence of three wires, 54 chains long, was erected in horse-paddock, at 7s. 5d. per chain.

The plantation being situated in a very bleak position, it was found necessary to erect a four-stalled stable.

During the early part of the year it was decided to build quarters for the accommodation of the workmen, but, owing to the Department resuming certain areas of land with cottages already erected thereon, the building was not required. Two cottages were purchased, one for £10 and another for £7.

Trees planted out during the season have taken well, with the exception of Oregon pine, these having all died—for no visible reason other than being unsuited to the climate and soil. American white-ash and redwood have done exceedingly well. Some of the *Eucalyptus redunca* planted four years ago have attained a height of 20 ft., with a girth of 18 in. *Podocarpus totara* have taken fairly well, there being about 15 per cent. dead; the rest are growing slowly.

Clearing round and pruning trees, and clearing and chipping fire-breaks, cost £529 6s. 6d.

The average number of men employed during the year was 11·97.

The following is a record of the rainfall and temperature for the year:—

Month.	Rainfall.	Number of Days Rain fell.	Maximum Temperature.	Date.	Minimum Temperature.	Date.
1907.	Inches.		Degrees.		Degrees.	
April	12·01	14	78	1st and 9th	36	29th
May	4·03	13	72	12th	30	14th
June	12·06	14	68	13th	28	16th
July	17·71	20	64	22nd	34	10th
August	14·45	24	66	29th	32	21st
September	3·01	15	72	25th	28	17th
October	4·96	13	78	21st	34	5th and 16th
November	6·75	11	88	20th	38	14th
December	12·59	12	84	19th	36	27th
1908.						
January	0·41	3	86	10th	50	6th and 19th
February	2·08	13	88	16th	50	17th
March	20·06	18	84	5th	44	16th and 17th
Totals ...	110·12	170	...	...	...	...

Expenditure.

	£	s.	d.
Amount at the 31st March, 1907	3,103	9	8
Pitting	370	2	6
Tree-planting	286	4	6
Clearing	29	5	3
Cartage of trees	50	1	8
General upkeep of plantation	529	6	6
„ repairs	10	18	7
Horse-feed purchased and grown	0	17	5
Fencing	87	18	5
Buildings	63	15	8
Tools, implements, &c.	38	15	9
Miscellaneous works	9	16	4
Salaries—			
Foresters	160	0	0
Nurseryman's proportion of, and travelling-expenses ...	18	0	0
Supervision	16	3	0
Tree-seeds	10	1	9
Road-formation	3	16	4
	£4,788	13	4

CHAS. HOOPER, Assistant Forester.
A. GORDON, Nurseryman in Charge.

REFERENCE-LIST OF FOREST TREES AND SHRUBS GROWN AT THE VARIOUS NURSERIES AND PLANTATIONS, 1907–8. (E, EVERGREEN; D, DECIDUOUS.)

Name of Tree.	Synonym.	Common Name.	Habitat.
Acacia melanoxylon (E) ..	..	Blackwood	South-east Australia.
Acer saccharum (D) ..	Acer saccharinum ..	Sugar-maple	North America.
„ pseudo-platanus (D) ..	..	Sycamore	Europe and Asia.
Æsculus hippocastanum (D)	..	Horse-chestnut	South-east Europe.
Alnus glutinosa (D) ..	..	Alder	Europe and Asia.
Betula alba (D)	..	Silver-birch	Europe.
Berberis aristata (D) ..	..	Barberry	Northern India.
Castanea sativa (D) ..	Castanea vesca ..	Sweet or Spanish chestnut..	Europe and Asia.
Catalpa speciosa (D) ..	Bignonia catalpa ..	Hardy catalpa	United States.
Chamæcyparis Lawsoniana (E)	Cupressus Lawsoniana	Lawson's cypress, or white-cedar	Northern California.
Cordyline Australis (E) ..	„ Australis ..	Ti, or cabbage-tree ..	New Zealand.
„ indivisa (E) ..	„ indivisa ..	Toi	South Island, New Zealand.
Eucalyptus amygdalina (E)	..	Almond-leaved peppermint-gum	Victoria, New South Wales, and Tasmania.
„ calophylla (E)	..	Red-gum..	South-west Australia.
„ capitellata (E)	..	Head-flowered stringy-bark	New South Wales and Gippsland.
„ corymbosa (E)	..	Bloodwood	New South Wales and South Queensland.
„ coccifera (E) ..	..	Mountain-peppermint ..	Alpine districts of Tasmania.
„ corynocalyx (E)	..	Sugar-gum	South-east Australia.
„ crebra (E) ..	..	Narrow-leaved ironbark ..	New South Wales and Queensland.
„ ficifolia (E) ..	..	Scarlet-flowering gum ..	South-west Australia.
„ globulus (E) ..	..	Blue-gum	Tasmania and Victoria.
„ Gunnii (E) ..	..	Cider-gum	Victoria, New South Wales, and Tasmania.
„ hæmastoma (E)	..	Gum-topped stringy-bark ..	Tasmania and Victoria.
„ leucoxylon (E)	Eucalyptus sideroxylon	Victorian red ironbark ..	South Australia.
„ macrorrhyncha (E)	..	Stringy-bark of Victoria ..	Victoria.
„ marginata (E) ..	..	Jarrah	South-west Australia.
„ Muellerii (E) ..	..	Mountain red-gum ..	Mountains of Tasmania.
„ maculata (E) ..	..	Spotted gum	New South Wales and Queensland.
„ obliqua (E) ..	..	Stringy-bark or messmate ..	Victoria, New South Wales, Tasmania.
„ pauciflora (E) ..	Eucalyptus coriacea ..	White or drooping gum ..	Ditto.
„ paniculata (E)	„ fasciculosa	Red ironbark	New South Wales and South-west Australia.
„ pilularis (E) ..	..	Blackbutt	New South Wales, Queensland, and Gippsland.
„ regnans (E) ..	..	Swamp-gum	Tasmania and Victoria.
„ saligna (E) ..	..	Grey or flooded gum ..	New South Wales and South Queensland.
„ Stuartiana (E)	..	Apple-scented gum ..	Tasmania and South-east Australia.
„ Sieberiana (E)	Eucalyptus virgata ..	Yowut, mountain ash ..	Ditto.
„ siderophloia (E)	„ persicifolia	Sydney ironbark	Eastern Queensland and Port Jackson.
„ teretecornis (E)	..	Red-gum of Queensland ..	New South Wales and Gippsland
„ urnigera (E) ..	..	Urn-bearing gum	Tasmania.
„ redunca (E) ..	..	The wando or white-gum ..	Western Australia.
„ resinifera (E) ..	..	Red or forest mahogany ..	New South Wales and Queensland.
„ viminalis (E) ..	..	Swamp or manna gum ..	Tasmania and Victoria.
Fraxinus Americana (D) ..	Fraxinus Acuminata, F. alba	White American ash ..	Eastern United States.
Fraxinus excelsior (D) ..	..	English ash	Europe and Asia.
Fagus sylvatica (D) ..	..	Beech	Europe.
Hikora ovata (D)	Carya alba	Shagbark, hickory ..	Eastern North America.
„ pecan (D) ..	„ oliviformis ..	Pecan-nut	„
Juglans cinerea (D) ..	..	Butternut	„
„ nigra (D) ..	..	Black walnut	„
„ regia (D) ..	..	Walnut	Europe and Asia.
Juniperus Virginiana (E ..	Juniperus Barbadensis	Red cedar	North America.
Larix Europæa (D) ..	Pinus larix	European larch	Europe.
Liriodendron tulipiferum (D)	..	Tulip-tree, basswood ..	United States.
Laburnum vulgare (D) ..	Cytisus laburnum ..	Laburnum	Europe.
Phormium tenax (E) ..	..	Flax	New Zealand.
Picea excelsa (E).. ..	Abies excelsa ..	Norway spruce	Europe.
„ sitchensis (E) ..	„ Menziesii ..	Tideland spruce	Alaska, Northern Canada.
„ Canadensis (E) ..	..	White-spruce	North-east United States.
Pinus Austriaca (E) ..	..	Austrian pine	Southern Europe.
„ Canariensis (E) ..	..	Canary pine	Canary Islands.
„ contorta (E) ..	Pinus Murrayana, Pinus Bolanderi	Twisted pine	Alaska to California.
„ Coulterii (E) ..	Pinus macrocarpa ..	Great-coned pine	California.
„ excelsa (E) ..	„ pendula ..	Himalayan pine	Himalayan Mountains.
„ flexilis (E).. ..	..	Limber pine	Rocky Mountains, Sierra Nevada.
„ halepensis (E) ..	..	Aleppo pine	Levant.
„ Lambertiana (E) ..	..	Sugar-pine	Northern California, Oregon.
„ Laricio (E) ..	..	Corsican pine	Southern Europe.
„ muricata (E) ..	..	Prickly-coned or Bishop's pine	California.
„ ponderosa (E) ..	..	Heavy or bull pine ..	North-west America.
„ ponderosa, var. Benthamiana (E)	..	Bentham's yellow-pine ..	British Columbia.

REFERENCE-LIST OF FOREST TREES AND SHRUBS GROWN AT THE VARIOUS NURSERIES AND PLANTATIONS, 1907–8. (E, EVERGREEN; D, DECIDUOUS)—*continued.*

Name of Tree.	Synonym.	Common Name.	Habitat.
Pinus pinaster (E) ..	Pinus maritima ..	Cluster-pine	Southern Europe.
„ radiata (E) ..	„ insignis ..	Monterey pine	California.
„ rigida (E)	..	Pitch-pine	New England to Virginia.
„ Sabiniana (E) ..	..	Nut-pine	California.
„ strobus (E) ..	..	Weymouth pine	North America.
Piptanthus Nepalensis (E)	..	Evergreen laburnum ..	Himalayas.
Pittosporum crassifolium (E	..	Karo	New Zealand.
„ eugenioides (E)	..	Matipo, tarata	„
„ tenuifolium (E)	..	„ tawhiri	„
„ Buchananii (E)	..	„ tawhiwhi	„
Populus deltoides (D) ..	Populus monolifera, Populus Canadensis	Canadian or black Italian poplar	North America.
Populus nigra pyramidalis (D)	Populus dilatata, Populus fastigata	Lombardy poplar ..	Europe and Northern Asia.
Podocarpus dacrydioides (E)	..	Kahikatea	New Zealand.
„ totara (E) ..	Nageia totara ..	Totara	„
„ Hallii (E) ..	„ Hallii ..	Large-leaved totara ..	„
Pseudotsuga taxifolia (E) ..	Abies Douglasii ..	Oregon pine	British Columbia, Pacific Coast &c.
Pyrus aucuparia (D) ..	Sorbus aucuparia ..	Rowan-tree, mountain-ash ..	Europe and Asia.
Quercus coccinea (D) ..	..	Scarlet oak	Eastern North America.
„ macrocarpa (D) ..	..	Burr oak	„
„ pedunculata (D) ..	Quercus robur ..	British oak	Europe and West Asia.
„ palustris (D) ..	..	Pin-oak	South-east of North America.
„ suber (D) ..	..	Cork-oak	Southern Europe.
Robinia pseudo acacia (D) ..	..	Black loquat or false acacia	Pennsylvania Mountains.
Salix Caprea (D)	..	Goat willow	Europe (Britain).
„ viminalis (D) ..	Salix longifolia ..	Common osier	„
„ vitellina (D) ..	..	Golden osier	Britain.
Sequoia sempervirens (E) ..	Taxodium sempervirens	Redwood	California.
Sophora tetraptera (E) or (D)	Edwardsia microphylla	Kowhai	New Zealand.
Vitex lucens (E)	..	Puriri	North New Zealand.

Approximate Cost of Paper.—Preparation, not given; printing, exclusive of illustrations (2,250 copies), £42 5s.

By Authority: JOHN MACKAY, Government Printer, Wellington.—1908.

Price 1s. 6d.]