1934.

NEW ZEALAND.

STATE FOREST SERVICE.

ANNUAL REPORT OF THE DIRECTOR OF FORESTRY FOR THE YEAR ENDED 31ST MARCH, 1934.

Presented to both Houses of the General Assembly pursuant to Section 64 of the Forests Act, 1921–22.

The DIRECTOR OF FORESTRY to the Hon. the COMMISSIONER OF STATE FORESTS.

SIR,— Wellington, 1st August, 1934.

I have the honour to submit herewith the annual report of all operations of the State Forest Service for the year ended 31st March, 1934, as required by section 64 of the Forests Act, 1921–22.

I have, &c.,

A. D. MCGAVOCK,
Director of Forestry.

Hon. E. A. Ransom,
Commissioner of State Forests.

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REPORT.

INTRODUCTION.

For easy reference a few of the major activities of the Service and other matters of general interest are briefly reviewed hereunder :—

Afforestation.—As a part of the general plan to provide as much labour as possible during the "off season"—*i.e.*, the winter months— the Service extended its tree-planting programme, and at the close of the season the total new area planted, in round figures, was 30,500 acres, an increase in area of approximately 87 per cent. in comparison with the 1933 figures. With the afforestation of a further 23,000 acres—the projected programme for the current season—the total area of the State plantations will exceed 400,000 acres.

Sales of Timber.—A more optimistic outlook obtained in the milling industry throughout the year, and the increase in timber-sales was very noticeable.

The year 1931–32 undoubtedly witnessed the peak of the depression in the sawmilling business, since when conditions have steadily improved, although some time must yet elapse before a return to normal conditions can be definitely assured.

Timber Production.—The total quantity of timber cut in the Dominion for the year was approximately 195,000,000 ft. board measure, of which approximately 24 per cent., or 49,400,000 ft., was cut from State forests.

Mining Privileges in State Forests.—Applications for mining privileges continue to increase, doubtless owing to the high price of gold, and in the Hokitika office alone seven hundred applications were received in the last twelve months. When it is pointed out that very many of the areas applied for are located in State forest and that every application must be investigated separately and the area not infrequently inspected and defined on the ground, some indication is given of the extra work thus thrown upon those offices of the Service which are in mining districts. Satisfactory arrangements have been entered into with the Mines Department to safeguard the interests of the forests.

Sawmills.—The year's operations showed very little change in the number of working sawmills, although the total number recorded has risen from 527 to 534, of which 3, when working, operate principally in native forests, 1 in exotic forests, and 5 in both native and exotic forests. Mills working in State forests averaged about 25 per cent. of the total, the actual figure being 138. A monthly average reveals that 180 mills worked full time.

Office Fire.—A fire occurred in the Head Office of the Service on the night of the 28th March, but, thanks to an excellent save by the local fire brigade, the fire, although fanned by a strong southerly wind, was quickly extinguished. No structural damage was done to the building, although it required complete relining, which has since been done, but certain scientific instruments were severely damaged and photographic and draughting records were blackened by smoke and water.

General.—The year's work has been often arduous and difficult, and the good results herein recorded could not have been accomplished without the loyal co-operation and able support of all officers.

FOREST POLICY.

General.—The prominence given to exotic-forest establishment in the general forestry programme during the last nine years has resulted in a tendency to view this particular activity in a false perspective, and, to bring the national-forestry situation into proper focus, it is necessary to restate the policy under which the State Forest Service is operating and must continue to operate.

The national forest policy has a two-fold purpose—the maintenance of climatic, soil, and water equilibria, and the supply of timber and other forest-produce. Owing to its influence upon agriculture, the former objective—viz., the conservation of the protection forests—is of the greater national significance. Conservation may be defined as the preservation of the forests by wise use, and the intensive management of these forests will assist to solve the problem of timber-supplies. It is with this latter consideration that the establishment of exotic forests is most intimately associated.

The outstanding features of the national timber-supply situation are—

(1) That of the remaining virgin forests over 80 per cent. are overmature stands in which there is no net growth. New growth is offset by decay, &c. :

(2) That the conversion of this 80 per cent. of overmature forests into healthy growing stands of indigenous species producing timber to the maximum capacity of the forest soil will necessitate silvicultural management extending over a long period, probably one hundred and fifty years :

(3) That current timber demands are depleting the virgin indigenous forests at such a rate that, without other provision being made, an adequate supply of timber would not be available during the whole of the intervening period :

(4) That the early establishment of exotic plantations as a supplementary forest capital resource is therefore of great importance, and it is for this reason that the establishment of large forests of exotic trees has assumed such proportions during recent years :

(5) That the part which these exotic forests will ultimately play in the forest economy of the Dominion, one hundred to one hundred and fifty years hence, is difficult to predict. Experience in foreign countries where forestry has been practised over a period of several centuries indicates, however, that exotic species have definite limitations, and for this reason the national policy must envisage the management of the indigenous forests to secure their maximum possible production of timber.

The State Forest Service has always kept this objective in view, and, coincident with the establishment of the exotic plantations, the silvicultural treatment of the various classes of indigenous forest has been studied. On the early completion of the establishment of the exotic forests as a supplementary resource, more attention will be given to the silvicultural treatment of the indigenous forests.

Management of Indigenous Forests.—On one feature of indigenous-forest management the public appears to be misinformed. The idea is prevalent that to preserve the existing indigenous forests to posterity, it is sufficient to fence them against stock and to protect them from fire. The idea is entirely erroneous. The composition of the forest gradually changes, one type of forest growth succeeding another. Generally, the valuable timber-producing species are replaced by weed species such as kamahi (*Weinmannia racemosa*), taraire (*Beilschmiedia taraire*), rewarewa (*Knightia excelsa*), &c. The outstanding example is the remaining kauri (*Agathis australis*) forests. Of all the indigenous softwoods amenable to silvicultural treatment, kauri is outstanding, and the results of investigations have been most promising. In many of the remaining kauri forests the percentage of overmature timber has risen already to as high as 50 per cent. (by volume), emphasizing the urgent need of marketing such timber before it further deteriorates, and of managing the forests to encourage the growth of the immature trees, and to secure re-establishment with young growth. By no other means can the kauri be preserved to posterity. If further neglected, the overmature trees will continue to decay and die, and the healthy ones will follow suit much quicker than otherwise, until ultimately the whole of the kauri growth will be replaced by a climax succession of taraire, rewarewa, &c., which already are commencing to take command. As soon, therefore, as the demand for timber returns to normal, it is the intention of the State Forest Service to bring the whole of the national kauri forests under management plans which will ensure their perpetuation for all time.

Other problems upon which work has already commenced—although admittedly on a small scale—concern the management of the rimu (*Dacrydium cupressinum*) pole-type forests of the coastal plains of Westland and the silver-beech (*Nothofagus Menziesii*) forests of Southland. How to introduce selective logging into the rimu pole-type forests without complete paralysis of the industry operating on these areas is a difficult question. The first step to be taken is the collection of increment data, and the completion of a growth study which has been in progress for six years is now in sight.

In review, the general forest policy may be stated as the perpetuation of the indigenous forests and the provision of a supplementary exotic-forest capital which, by rapid growth, will eke out the supplies of indigenous timber and bridge the gap between the exhaustion of the overmature indigenous forests which otherwise would occur, and their conversion into healthy productive forests. With the establishment of the exotic plantations now approaching completion, it will be possible to give proper attention to the silvicultural treatment of the indigenous forests. The timber-supply position of the future envisages a balanced yield from both exotic and indigenous forests, and the future alone will determine the relative importance of the two sources of supply.

Composition of the Exotic Forests.—For the establishment of exotic-forest resources it has been the policy to concentrate upon those species which, from previous experience in New Zealand, appear suitable for growing in the various localities and each of which possesses a diversity of uses. Except on a strictly experimental scale, planting has been avoided of any species which yield timber either of restricted uses or intended for the production of any one type of product. Briefly, the policy is one of diversification of species with diversification of use.

The underlying motive has been to spread the risk of wholesale or epidemic damage by insect and fungal attack, and it is primarily in pursuit of this objective that the current plantings are largely of Douglas fir (*Pseudotsuga taxifolia*), Corsican pine (*Pinus Laricio*), pondosa pine (*P. ponderosa*), Bishop's pine (*P. muricata*), lodge-pole pine (*P. Murrayana*), insignis pine (*P. radiata*), and Lawson's cypress (*Cupressus Lawsoniana*). At the completion of the establishment programme it is anticipated that no one species will form more than 30 per cent. of the total. In search of new species for future work, experimental plantings, of course, are being made every year.

The purpose of avoiding the establishment of species with restricted use or for any one particular purpose is to guard against the failure of the anticipated demand owing to the disappearance or changing of the particular field or fields of use during the growth of the trees. Again, exotic trees may produce timbers quite different to those produced in their native habitat and unsuitable for the purposes anticipated. No risk is incurred, however, if woods of high general utility are produced, since new uses are developed almost as rapidly as old ones disappear or change. A specific instance occurred in California at the end of last century, when Australian eucalypts were established for the production of poles and railway sleepers. The growth of these trees was too rapid, and consequently the wood split and shrank badly while seasoning, and was of poor durability. They proved unsuitable for the purposes mentioned, and commanded only a firewood value.

Utilization of the Exotic Forests.—The saw log has always been visualized as the major product of the exotic forests, and no exotic forests have been established for the production of either pulpwood or any other particular product. As the population of the Dominion increases and likewise the consumption of pulp and paper products, it is possible that economically sized pulp-production units may become feasible. Should this prove to be the case, a supply of raw material for the cheaper classes of pulp and paper products, which form the bulk of the trade, may become available from the exotic

forests, but in the form of low-grade logs and sawmill waste, since for the utilization of high-grade logs down to 4 in. diameter inside bark (which is the smallest timber usually accepted by pulp-mills) the Scandinavian type of sawmill is as well adapted as the pulping unit, possessing the additional advantages of smaller size and lower investment.

Already the production of exotic timber has attained a level of 15,000,000 ft. board measure per annum, and is rapidly increasing, the increase being limited solely by the lack of available supplies of mature trees. All available supplies of thinnings will probably be required for many years to maintain this increasing production; and the fact that over 80 per cent. of the Dominion's fruit and cheese exports, and enormous quantities of other boxed goods, are shipped in exotic-pine timber containers is evidence of the growing popularity of these woods. Likewise they are replacing white-pine (*Podocarpus dacrydioides*) for concrete boxing and rimu for rough constructional, scaffolding, and general building framework, while in some districts complete houses and other buildings are being constructed of exotic timbers.

CHAPTER I.—MANAGEMENT.

1. Areas of State Forests as at 31st March, 1934.

TABLE 1.

Forest Conservation Region.	State Forests.		Provisional State Forests.		Totals.	Percentage of Total Area in Region under Reservation.
	Ordinary.	National Endowment.	Ordinary.	National Endowment.		
	Acres.	Acres.	Acres.	Acres.	Acres.	
Auckland ..	172,698	38,218	246,136	57,709	514,761	5·99
Rotorua ..	318,465	227,881	151,721	92,414	790,481	15·73
Wellington ..	881,336	37,309	106,473	36,231	1,061,349	7·09
Nelson ..	196,093	29,836	1,290,910	717,903	2,234,742	31·89
Westland ..	455,318	54,340	669,594	539,473	1,718,725	44·48
Canterbury ..	332,746	3,647	..	..	336,393	3·39
Southland ..	277,902	..	880,187	67,034	1,225,123	7·22
Totals ..	2,634,558	391,231	3,345,021	1,510,764	7,881,574	11·87

At the close of the year the total area under Forest Service control was 7,881,574 acres, a net increase of 40,136 acres when compared with the figures for the previous year. The total new area proclaimed was 38,490 acres, and the area withdrawn from reservation 8,048 acres.

Although since the inception of the Service fourteen years ago the area dedicated to forestry has progressively increased by approximately 4,000,000 acres, or by more than 50 per cent., it does not yet comprise 12 per cent. of the superficial area of the whole Dominion—a fact which provides food for serious thought when it is stated that in the considered opinion of Old World foresters of recognized repute an insular country such as ours, to attain the minimum safety-point, should, as a general rule, have not less than 25 per cent. of its area placed under forest management.

The largest individual block withdrawn was 2,300 acres of cut-over bush land in North Auckland, which was made available for settlement under the Land Act; a block of 1,900 acres was added to the Sounds National Park, whilst areas set apart as scenic reserves in various parts of the Dominion accounted for another 964 acres. Other areas released for settlement were (in land districts) North Auckland, 760 acres; Nelson, 1,000 acres; Marlborough, 132 acres; and Westland, 883 acres. Certain adjustments to the total area were rendered necessary during the year owing to later surveys, amendments of existing boundaries, &c., and these corrections resulted in the grand total being increased by 9,693 acres.

The following tables (Nos. 2 and 3) summarize the changes in area referred to:—

TABLE 2.

Summary of Areas withdrawn from State and Provisional State Forest Reservation, 1st April, 1933, to 31st March, 1934.

Forest Conservation Region.	For Settlement Purposes.		For Scenic Reserve: Provisional State Forest.	For Recreation Reserve: Provisional State Forest.	For National Park: Provisional State Forest.	Total.
	State Forest.	Provisional State Forest.				
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Auckland ..	2,348	781	..	..	..	3,129
Rotorua ..	2	..	..	..	..	2
Nelson ..	133	1,000	964	..	..	2,097
Westland ..	39	844	..	..	..	883
Southland ..	..	..	..	38	1,900	1,938
Totals ..	2,522	2,625	964	38	1,900	8,049

TABLE 3.

SUMMARY OF AREAS ADDED TO STATE AND PROVISIONAL STATE FORESTS, 1ST APRIL, 1933, TO 31ST MARCH, 1934.

Forest Conservation Region.	Indigenous Forest.			Afforestation Land.			Total.
	State Forest: Ordinary.	Provisional State Forest: Ordinary.	Provisional State Forest: National Endowment.	State Forest: Ordinary.	State Forest: National Endowment.	Provisional State Forest: National Endowment.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Auckland ..	..	..	..	12	..	..	12
Rotorua ..	137	..	..	3	..	..	140
Wellington ..	..	2,850	..	31,138*	1,351*	..	35,339
Nelson	..	..	..	2	..	..	2
Westland ..	..	134	499	..	..	84	717
Southland ..	..	2,220	..	58	..	..	2,278
Totals ..	137	5,204	499	31,213	1,351	84	38,488

* Karioi Plantation.

2. PROTECTION FORESTS.

It has been stated in previous reports and may, I think, with profit be repeated here, that the purpose underlying the legislation of 1918 and subsequent years authorizing the State to set aside areas as provisional State forests was that as time and opportunity permitted such areas would be carefully examined to determine their ultimate suitability for permanent reservation as State forests or their release for settlement under the Land Act, if and when the milling-timber thereon was removed.

This objective has been steadily pursued, with the result that the area of State forests is being slowly but surely built up, while, of course, a corresponding reduction must take place in the provisional State forest estate. Last year 74,150 acres were permanently reserved in this way, and although, owing to financial limitations and other reasons, this work cannot be completed for some time, yet it will be continued to finality.

The great bulk of this forest is of the "protection" type, and it is pleasing to record that a sound "forest sense" in regard to the value of such forests is becoming more and more apparent throughout the Dominion, due probably to some extent to the recent rapid growth of tramping clubs, whose members obtain first-hand knowledge of the great service these forests render by the regulation and conservation of stream-flow, the prevention of rapid run-off, &c., or, conversely, the great damage wrought by the destructive forces of nature on hilly country denuded of its forest cover—*e.g.*, erosion, land-slides, &c., with the natural corollary, the silting-up of rivers and flooding of valleys.

Too much emphasis cannot be placed upon the fact that the greatest natural enemies to the standing bush and forest regeneration are fire and browsing animals, and it may be regarded as a *sine qua non* that unless these two menaces are rigidly suppressed all efforts to conserve and regenerate our forests will prove futile.

3. FOREST RECONNAISSANCE, DEMARCATION, AND SURVEYS.

Indigenous Forests.

Forest Inventory.—The revision of the forest inventory of the timber resources of the Dominion has made steady progress during the year. The data have been obtained from office records, timber-cruising, forest reconnaissance, and inspections by the field staff.

Forest Reconnaissance.—Field-work has been confined to Wellington, Westland, and Southland; 50,600 acres have been examined in detail. In the Westland Region a forest officer, by taking part in an aeroplane flight over Okuru and Jackson's Bay, obtained valuable data in regard to the resources of those regions.

Demarcation.—Over 1,000 chains of State forest boundary-lines were cut and measured.

Bush-tramway Surveys.—Some 800 chains of bush-tramways were located, and their positions fixed on the forest plans and maps.

Timber-cruising.—In State and provisional State forest 6,049 acres, containing 44,611,000 ft. board measure were cruised. Cruises of 5,377 acres, containing 55,662,000 ft. board measure were made for other Government Departments and local bodies.

Afforestation Areas.

Topographical and Layout Surveys.—Over 14,000 acres of land were surveyed topographically and 19,000 acres were subdivided into compartments.

Roads and Tracks.—Access roads for a total distance of 2,000 chains were constructed.

Species Surveys.—The field staff located the position of 30,335 acres of newly planted area in order that the species may be shown in their relative position on the maps.

Special Survey.—An inspection and survey were made and plans prepared of a private afforestation area in the Nelson Region containing 2,500 acres. The object of this investigation was to determine the area established in trees.

Timber-cruising.—An area of 86 acres, containing 2,328,000 ft. board measure, was cruised in the Southland Region for a private owner.

Silvicultural Survey of Exotic Forests.—During the year some 25,000 acres of exotic forests situated in the Auckland Conservancy were closely examined on the ground with a view to evaluating the work already done and deciding on future activities. Statements setting out the present condition of the areas and detailing their silvicultural requirements for the next five years are now in the course of completion. In order to facilitate the inspection special plans 1 ft. 6 in. by 2 ft., on a scale of 5 chains to an inch, were compiled at Head Office, showing species and contour-lines and were of considerable help in quickly fixing the positions of the failed, established, and waste areas. This work will be continued until all the State plantations have been dealt with.

4. Forest Atlas.

During the year forty-seven general-purpose plans were added to the record. To the forest atlas 546 additions (comprising additions to and deletions from State forests, recording of sawmill, grazing, and mining license, &c.) were made, and to the forest register fifty-four additions were made.

Work on plantation plans comprised the preparation of two topographical plans (Pebbly Hills and Golden Downs) and one species plan (Waipoua), and additions were made to the topographical and species plans of all plantations; forty-three white prints, prepared from the above plans, were coloured for use as species plans.

The Public Works, Railway, and Post and Telegraph Departments prepared for Service use 327 helio prints and 171 photostat prints, of which 152 and 90 respectively were for regional use. One map (Rimutaka Range) was prepared for lithography, and 300 copies were printed.

5. State Afforestation.

The following summarized statement sets out the position regarding the establishment of State exotic plantations at the close of the year. From it it will be seen that the new planted areas total 30,532 acres, of which 23,159 acres are located on Kaingaroa Plains, Rotorua Region. Other main areas in order of size are Golden Downs (Nelson Region) 2,181 acres; Tairua (Auckland Region) 1,927 acres; Karioi (Wellington Region) 1,199 acres. The total figures for the previous year's planting were 15,958 acres, and during the forthcoming season it is anticipated that at least a further 23,000 acres will be afforested.

The grand total area of all State plantations throughout the Dominion is 394,000 acres.

TABLE 4.

Summary of Operations in Plantations as at 31st March, 1934.

Plantation.	Year of Establishment.	New Area planted, 1933.	Total Net Area established.	Gross Area of Plantation.
		Acres.	Acres.	Acres.
Waipoua	1925	532	824	12,600
Puhipuhi	1904	..	849	1,558
Riverhead	1926	241	10,999	11,934
Maramarua	1928	197	12,280	14,146
Tairua	1930	1,927	9,930	54,400
Whakarewarewa	1898	..	7,591	10,076
Waiotapu	1901	..	7,051	8,003
Kaingaroa	1913	23,159	233,055	329,065
Erua	1930	449	2,359	3,477
Karioi	1927	1,199	16,077*	33,689
Golden Downs	1927	2,281	17,757	22,527
Westland	1922	272	3,063	8,006
Hanmer	1901	..	7,750	10,308
Balmoral	1916	31	20,647	24,014
Eyrewell	1928	88	18,055	19,266
Dusky Hill	1898	..	4,368	6,829
Conical Hills	1903	..	3,551	3,765
Naseby	1900	..	3,308	4,032
Pukerau	1915	..	565	628
Blue Mountains	1925	27	8,732	9,628
Pebbly Hills	1930	7	4,332	5,867
Minor areas	1875–1933	122	855	2,947
Totals	..	30,532	393,998*	596,765

* 1,163 acres direct sown in 1932 excluded.

6. Plantation Cleaning and Thinning.

In Whakarewarewa Plantation 130 *E. risdoni* poles were thinned from compartments in Block VII, and already ninety poles have been disposed of to a Government Department, the remaining ones being held to fulfil future orders. In Waiotapu Plantation 662 cords of firewood were obtained from the thinning of 29 acres in various compartments. The wood was used for fuel at the various planting-camps on Kaingaroa Plains.

In Hanmer Plantation thinning was carried out over a total area of 226 acres, of which 72 acres was thinned for the second time. In the older portion of Balmoral Plantation 61 acres was thinned and on 104 acres pruning was done to a height of 5 ft. The material removed was utilized as follows: Hanmer, 2,636 cords firewood, 343 posts, 128 poles, 888 rails, 33,740 ft. board measure sawn timber. Balmoral, 350 cords firewood, 700 posts and poles. At Conical Hills 309 acres of mixed pine plantations were underscrubbed and given a light "A" grade thinning, all malformed and whip trees being removed. In Blocks XV and VIII, Naseby Plantation, underscrubbing and thinning were completed over areas of 133 acres and 91 acres respectively.

At Dusky Plantation thinning was carried out on an area of 19 acres.

A trial lot of *P. Laricio* thinnings was sold for mine-props which have proved quite satisfactory, so that as mining operations extend in Otago further sales of this nature are probable.

7. Timber-sales.

The year's record shows increased activity in this branch of the work of the Service, which may be regarded as a hopeful sign that the milling industry is now definitely on the highroad to economic recovery after experiencing several very lean years. Probably a fillip was given to the trade by the fact that stocks of timber accumulated in former good years were practically exhausted, and undoubtedly a further contributing factor was the building subsidy granted by the Unemployment Board, which operated over the major portion of the year.

During the troublous times through which the industry has been passing it has been the aim of the Service to offer milling-timber, as far as possible, in small parcels with easy payments commensurate with the cutting requirements and finance of applicants.

This is mutually advantageous to the buyer who is not embarrassed by being compelled to seek fresh capital on a difficult monetary market and to the State which can exercise closer supervision over the operation and obtain payment with less risk of bad debts.

That this policy has been appreciated is evidenced by the fact that fully 75 per cent. of the year's sales comes under the category mentioned, the exceptions being where well-established operators with big cutting-capacity mills required large blocks to keep their hands and plant employed, or where a mill was being shifted to a new bush which entailed the laying-down of an expensive tram-line before logging could be commenced, and the miller had thus to be assured of a fair milling "life."

Sales of miscellaneous forest produce—posts, poles, battens, strainers, props, stays, house-blocks, firewood, &c.—were much more numerous than for several years. Under this head nearly two hundred permits were issued; in addition 1,650,000 ft. board measure of milling-timber was disposed of by permit, the total value over all exceeding £3,000. The increase in sales of timber may be gauged by a comparison of the year's results with the three previous years, figures for which are appended:—

Year.	Number of Sales.	Quantity sold.	Sale Price.
		Board Feet.	£
1930–31	56	42,118,024	41,853
1931–32	30	12,240,000	16,435
1932–33	51	32,314,954	35,633
1933–34	83	49,026,302	52,118

The quantity of timber cut from State forests for the year was approximately 49,406,300 ft. board measure, which is 24·7 per cent. of the total cut for the whole Dominion.

8. Concessions to Sawmillers.

The various concessions enjoyed by sawmillers during the year are summarized hereunder:—

(*a*) A rebate of 10 per cent. for prompt payment of forest royalty from whatever source (this applied also to all promissory notes postponed by arrangement).
(*b*) Abolition of payment of ground rent on sawmill areas.
(*c*) Waiving of usual interest charged on overdue promissory notes.
(*d*) The offering of timber only in response to an application from a *bona fide* and established miller (this prevents the creation of new milling-units).

In addition to these general concessions, others of interest, particularly to exporters of timber, are:

(*a*) A 10-per.-cent. reduction of royalty on rimu, matai (*Podocarpus spicatus*), and tawa (*Beilschmiedia tawa*) exported to Australia and Great Britain, and on silver-beech (*Nothofagus Menziesii*) exported to Great Britain.
(*b*) A reduction of 20 per cent. off railway freights on all such timber.
(*c*) A special subsidy of 1s. per 100 ft. granted by the Unemployment Board on silver-beech and tawa exported to England and 6d. per 100 ft. on tawa exported to Australia.

9. Ecology and Silviculture.

No new projects were undertaken during the year, but the accumulated data with respect to certain aspects of forest-management as recorded in previous reports were added to by routine observation, &c. It goes without saying that, as these investigations are long-time studies, the reports of annual progress must necessarily be meagre, particularly in the early stages.

The most important forest types under investigation are the kauri in North Auckland, the silver-pine at Erua (Main Trunk line), the rimu in Westland, and the silver-beech in Southland, and, although these studies have been all of short duration, the results to date are sufficiently promising to warrant a continuance of the work.

The periodical measurement of sample plots in the exotic forests to secure annual-increment data will be continued as opportunity permits.

Further attention has been given to the possibility of the establishment of exotics in cut-over indigenous forest areas, and plots are under observation at Mamaku, Erua, Golden Downs, and in Westland.

CHAPTER II.—PROTECTION.

1. Fires and Fire Districts.

A fairly dangerous fire season obtained throughout the Dominion, and in parts of the North Island and in Nelson and Canterbury the spring and early summer months were very dry; and the fire hazard for that period gave rise to some anxiety. During the Christmas season and in early January, when camping in State forests is usually at its peak, heavy rain fell in most parts, and all fire danger was removed.

The material losses by fire were small. In all, six fires were reported from Auckland Region; two were settlers' fires, which encroached on State forests, doing no damage; one occurred in old sawmill workings; one got out of hand while burning to clear firebreaks at Waipoua, but was put out without damage, and similar success attended another small fire at Puhipuhi Plantation. A settler's fire spread into Tairua Plantation and destroyed 20 acres of young trees. In Rotorua Region no fires entered either the exotic or the indigenous forests.

In Wellington Region eight fires were reported, six of which were in the Main Trunk district. The most serious one was, it is suspected, caused by a spark from a railway locomotive, and spread into Karioi Plantation, burning 59 acres of poorly growing *P. radiata* trees. The scorched trees were cut out and the block replanted with *P. ponderosa* and *P. Murrayana*.

In parts of Nelson Region the fire danger was fairly acute for several months, and although numerous settlers' fires were reported, only five minor outbreaks at Golden Downs Plantation concerned the State; no damage was done. There fires occurred in private plantations.

Much the same position obtained in Canterbury Region; no plantation fires took place, but two were reported in indigenous forests, doing negligible damage.

Three private plantations suffered by fire—in two instances serious loss resulted; 400 acres of growing trees were destroyed, valued at £7,250.

The only fire in Southland Region was not serious from the Service viewpoint, although the sawmiller in whose cut-over area it occurred lost 25 chains of tramway thereby.

In all regions fire patrols were on duty during the dry months of the year, and fire lookout stations were maintained at the principal plantations.

In this connection it may be interesting to record that in Westland Region a growing rimu-tree has been used to provide a look-out post, 82 ft. high, from which practically all parts of the plantation may be clearly seen.

Fire Districts.

Forty-four fire districts have been constituted under the Forests Act; of these, thirty-five concern State forests, the other nine being private fire districts. One new district of 9,950 acres, to embrace Pebbly Hills Plantation, Southland Region, was gazetted during the year. The value of fire districts as a means of regulating and controlling settlers' "burning-off" fires, &c., and preventing indiscriminate burning generally, cannot be overestimated.

2. Forest Parasite Biology.

It has already been recorded in a previous paragraph that climatically the past season was an exceptional one, inducing a high degree of fire hazard in most districts. The Nelson district records "one of the most prolonged dry spells experienced for many years"; and there is no doubt that this and other climatic abnormalities were reflected in the pathology of the forests. The increase in the numbers of dead saplings in young exotic forests of the pole stage in the drought-stricken district was most marked—probably due to increased severity of *Diplodia* killing on drought-weakened stock in dense stands. This affected State forests but little, as there are few State-owned stands of this age in the area in question. This loss, moreover, was proably more than offset by other features similarly traceable to climatic aberrancies. The October–November late frosts, which are deemed to be the principal inducing cause of the *Phomopsis* attacks of the past two seasons, were almost absent; but were replaced by a series of frosts of exceptional severity experienced during December and January. Unfortunately, the areas on the southern end of the Kaingaroa Plateau, which were affected by a very exceptional late January frost, are not provided with thermometers. The intensity of the

frost cannot therefore be recorded, but the result was a quite appreciable mortality on newly planted areas in the vicinity, whilst the December frosts at Rotorua severely cut back about an acre of lined-out stock.

From the pathological viewpoint, the interesting point is that these and other extremely unseasonable frosts were seemingly even more calamitous to the parasites than they were to the forest stocks.

The absence of November frosts is deemed to be the chief factor in markedly reducing the virulence of *Phomopsis* wilting on areas badly affected the previous season. The fungus undoubtedly effects an entry into the tree tissues principally through minute lesions caused by frost on early flushing shoots (the Mycologist has performed a series of experiments in refrigeration chambers which confirm this). In the past season the frosts, although unseasonable, were so exceptionally late that young growth had hardened appreciably; and it may be, in addition—though this is not known—that the spores are no longer viable as late as January. Similarly, the Forest Entomologist, in reporting the cessation of the small outbreaks in Canterbury of *Hybernia indocilis*, a defoliating caterpillar referred to in last year's report, states that "a series of very late frosts completed the destruction of the insect."

It is apparent, therefore, that the past season, though adverse from the purely silvicultural point of view, brought certain compensations only because of the presence of the small investigational staff maintained. The cases cited emphasize the close relationship that must exist between the study of forest pathology and that of climatology, and the importance of a knowledge of the life-history of every forest pest in all its details. These studies are frequently criticized as purely academic; but they are all of great practical value if they can be oriented towards the discovery of the most vulnerable links in the life-history chain.

The summarized results of work recorded in previous reports as begun may be set out as follows:—

(1) *Hybernia indocilis*.—The arsenical spray programme forecast in last year's report was duly put into force. This definitely reduced the insect population on the small areas of the outbreak; and, as recorded above, exceptional summer frosts completed the work. This insect, however, being an indigneous species, cannot be deemed to be exterminated. It has merely been reduced to its normal numbers and finds adequate food on its indigenous host plant, *Discaria toumatou*. Laboratory feeding and starvation tests carried out during the past year show that the larva apparently cannot feed upon pine needles until it is at least fifteen days old. *Discaria* is therefore essential to its life cycle, and as the growing pine stands are rapidly suppressing this shrub further epidemics are not to be feared, and *Hybernia* becomes of minor significance as a forest pest.

(2) *Parasitic Insects*.—No definite success can yet be recorded from liberations of imported parasites of *Hylastes ater*, *Sirex noctilio*, or *Pineus pini*.

(3) *Mycology*.—Mycological work on the diseases listed in the last report has gone forward both in the laboratory and in the field. The most interesting and hopeful feature has been narrated earlier in this paragraph.

A new factor that has arisen as a result of the year's work is proof of the frequency of introduction of fungal diseases through tree-seeds, and the necessity for the introduction of an effective yet simple and cheap routine for seed disinfection. Treatments have been devised, which, though seemingly simple in the laboratory, are apparently not wholly applicable to large-scale practice in the nursery. Modifications and further trials will be made in the incoming spring.

3. Forest Protection against Browsing and Grazing Animals.

The need for extermination of pests of this nature has not diminished, the chief factor in favour of the animal being the still depressed skin and fur market.

Recorded kills in State forest total 48,000 (49,000 in 1932); and, in addition to this, three extensive poisoning campaigns were carried out, from which numerical results cannot be given. The total cost of this work has been £3,250.

Rotorua inaugurated special work against wild horses which were becoming troublesome, and 263 were killed by the rabbiters in the course of their ordinary duties. This Conservancy also reports that red deer are undoubtedly increasing in the planted areas, where they find almost impregnable harbourage in the dense young stands.

CHAPTER III—UTILIZATION.

Investigations into all the major problems relating to the utilization of forest products have been in progress for many years, and cover the fields of physical and mechanical properties of timber, timber physics, and kiln drying, wood-preservation, pulp and paper, derived products, and industrial uses of timber.

1. Indigenous Forests.

Strength and Physical Properties of Woods.—A pre-requisite to the extended utilization of the indigenous timbers by the local wood-using industries is a thorough knowledge of their mechanical and physical properties. Tests to determine these have been carried out over a period of ten years, and the results presented in a number of publications describing the properties and uses of the different woods, leaflets dealing with kauri, miro (*Podocarpus ferrugineus*), matai (*Podocarpus spicatus*), and totara (*Podocarpus totara*) having been completed recently for printing. As a direct outcome of the work, allowable working-stresses for the design of poles and cross-arms were substantially increased during the year.

Butter-box Tests.—The outstanding feature of the export butter-box trade is the increasing use of the Saranac box, which accounted for 51 per cent. of the total boxes exported during the 1933–34 season. In spite of its poor insulation properties and low re-use value, this type of package continues to gain in popularity, and the first factory to substitute veneer stock for sawn timber was established during the year. Shippers also continue to experiment with fibre-board boxes, but here again the disadvantage of poor insulation acts as a deterrent to their use. To economize white-pine supplies, sap rimu and miro are being used in increasing quantities for cheese-crates and milk-powder boxes, while experiments are still in progress to determine the value of sap rimu for butter-boxes, a shipment having been forwarded recently to London for observation and report.

Kiln Drying.—In accordance with the Department's policy of encouraging better seasoning practices for New Zealand timbers, the services of technical officers were made available to timber operators who installed dry kilns in Westland and Invercargill. These officers supervised the drying of initial charges and trained operators for the subsequent management of the kilns. Schedules were developed in Westland for the drying of white-pine, and in Southland for the drying of rimu.

Wood-preservation.—An inspection was made of the 100 rimu poles creosoted in Westland in 1930 and placed in service lines in Canterbury and Greymouth by the Post and Telegraph Department soon after treatment. All the treated poles are still free from decay, but the severe checking which has occurred in the poles installed in the drier part of Canterbury indicates the necessity for artificially seasoning poles intended for this locality prior to treatment. In response to numerous requests for information on the control and prevention of borer attack, a manuscript has been prepared for publication.

Experiments were also conducted by the Dominion Laboratory into the possibility of preserving the pigment figure in heart rimu which, unfortunately, is liable to bleach out when exposed to sunlight. Promising results have been secured, using cobalt mixtures under accelerated exposure conditions, and the tests are being continued on a wider scale than previously to ascertain the commercial possibilities of the treatment.

Wood Identification.—The identification of New Zealand and foreign woods has continued to receive attention, and a valuable store of information has been accumulated to facilitate routine requests for identification.

New Uses for Local Woods.—Markets for New Zealand timbers generally have gradually been extended and new uses found. Thus, pencil-manufacturers in Australia and Great Britain were interested in totara for lead-pencil manufacture, while locally the use of tawa for the manufacture of clothes-pegs, dowels, and handles was considerably increased. Tests are at present in progress to determine the suitability of silver-beech for cable-separators, of southern rata (*Metrosideros lucida*) for telegraph cross-arms, of silver-beech for beer-barrels, and of tawa for shoe-heels.

2. Exotic Forests.

Exotic-pine Timbers for Butter-boxes.—The steady depletion of indigenous white-pine supplies in the North Island has aroused considerable speculation as to the possibilities of using exotic-pine timbers for butter-boxes. As the Council for Scientific and Industrial Research of Australia had proved that a casein coating on the inside of exotic-pine boxes was successful in eliminating taint, co-operation was effected with the Dairy Research Institute, Palmerston North, in demonstrating the process locally. Owing to the general superiority of the indigenous white-pine, however, and the cost of the treatment, it is probable that the process will not become of great commercial significance until white-pine supplies are much further depleted.

Utilization of Thinnings.—With the increased shortage of mature insignis-pine stands in New Zealand, sawmillers are giving attention to the possibility of utilizing exotic softwood thinnings for the manufacture of boxes and crates. The first sale of timber for such purposes was made during this year, a substantial volume of thinnings having been contracted for from the older stands in the Dusky and Conical Hills Plantations. The material available is particularly suitable for crates and boxes of the batten type, such as cheese-crates, fruit-cases for the Island trade, &c., and cases for the banana trade have already been supplied to Samoa.

Thinnings from the exotic forests have also found favour for mining work, and, with the development of cheap preservative treatments, may be expected to dominate this market.

Creosoting of Exotic Fencing-timbers.—Fencing-posts of various exotic species, preserved with creosote and erected at varying periods during the past twelve years, show the excellent durability which can be secured by suitable preservative treatments with timbers which are naturally non-durable in the ground. Treated posts of larch (*Larix decidua*), Douglas fir, and a number of gums (*Eucalyptus* spp.) are all sound after twelve years' service at Rotorua, while many small-sized thinnings of Corsican, Austrian (*P. austriaca*), and pondosa pine are exhibiting good durability after eight years' service, and although some of the lightly treated pine-posts have decayed, the heavier-treated posts are still in perfect condition, and will last many years longer. As a result of these tests, it is proposed to treat several thousand posts for current fencing projects during the coming year.

Durability of Exotic Pole-timbers.—Information continues to be accumulated on the durability of locally grown gums for pole-line construction. *Eucalyptus globulus*, which is the only species to have been used extensively, appears to have a relatively short life of less than seven years, and, while it is too early to draw any definite conclusions regarding the durability of other species, the few *Eucalyptus risdoni* poles which have been used promise excellent results. A study to determine the possibilities of creosoting *Eucalyptus ovata* poles is in progress, one hundred poles now being seasoned preparatory to treatment.

CHAPTER IV.—THE TIMBER TRADE.

1. General.

Production.—The timber produced in the Dominion for the year ended 31st March, 1934, is estimated at approximately 195,000,000 ft. board measure, or 18 per cent. higher than the quantity reported for the previous year (see Table No. 6). It is anticipated that the greater part of this increase will be accounted for by rimu, the demand for which has been stimulated both by the building subsidy policy of the Unemployment Board and the improved tone on the Australian markets.

The three species—rimu, white-pine, and insignis pine—now constitute over 80 per cent. of all timber produced in New Zealand, while the two provincial districts of Auckland and Westland are responsible for over two-thirds of the total cut. Interest in the exploitation of Westland supplies has been well maintained, more especially in white-pine, and logs of this species are being transported as far as Auckland City for the manufacture of wire-bound veneer butter-boxes.

Sawmill Statistics.—The sawmills of the Dominion, as recorded by the Forest Service, now number 534. Of these 438 are working exclusively in indigenous forests and 61 exclusively in exotic plantations. The remaining 35 mills included in the total, cut both indigenous and exotic timber. Of the total mills, 29 per cent. are closed down, 40 per cent. are working part-time only, and 31 per cent. are working full time, the year's working again showing a slight improvement on the figures for the previous period.

2. Markets.

Domestic.—The domestic markets showed considerable improvement during the latter part of the period under review, firmer prices and reduced discounts reflecting the improved demand for building-timbers.

Building-timbers.—A marked increase occurred in the number of new houses erected, 1,981 dwelling permits being issued in the principal towns, as compared with only 997 and 1,089 for the two corresponding years of 1933 and 1932. While the building-subsidy policy of the Unemployment Board undoubtedly accounted for the greater part of this increase, it is just as certain that some part of the improvement was the result of returning confidence in private building enterprise. Nevertheless, new housing construction falls far short of actual requirements, and to stimulate private enterprise still further it is hoped that prices will be kept as low as possible consistent with a fair return to efficient and reasonably capitalized operation.

Box and Crate Industry.—Of all the wood-using industries in New Zealand, probably only the box and crate industry has been favoured with increased demands for its products during the past four years. Coincident with marked annual increases in the production of butter and cheese, and to a lesser extent fruit, necessitating progressively increasing supplies of boxes, improved local manufacture and adverse foreign exchange conditions have led to a marked decrease in importations. Whereas only a few years ago substantial quantities of the butter, cheese, and apples exported from New Zealand were shipped in foreign containers, to-day less than 10 per cent. of the butter is so shipped, and only negligible quantities of cheese and apples.

3. Imports and Exports.

General.—While the total importation of timber into New Zealand increased substantially on the extremely low figure of 1932, the total of 12,000,000 ft. board measure recorded in Table No. 7 must be considered small, when it is considered that over 7,000,000 ft. board measure consisted of Australian hardwoods, which are recognized as largely non-competitive with New Zealand timbers and essential for many of the special purposes for which they are imported.

The improvement shown in the export of timber during 1932 was largely maintained during 1933, the year's exports being almost 50 per cent. above the low record of 1931, although 5 per cent. below the 1932 exports.

Exports to Great Britain.—An account of the investigations made by the timber delegation to Great Britain in 1932–33 into the possibilities of marketing New Zealand timbers in that country was given in last year's annual report. As a result of the delegation's activities, 180,000 ft. board measure of silver-beech and 15,000 ft. board measure of rimu were delivered during the year, and the general appearance, quality, and grading of the silver-beech and the manner in which specifications were faithfully followed, called forth favourable comment from Home buyers. While the quality, &c., of the rimu was satisfactory, buyers were critical in that the specifications as regards width and length of the timber were not rigidly adhered to, and stressed that, if New Zealand hoped to market timber in Great Britain, it was essential for contracts to be strictly observed.

Export of Rimu to Australia.—The most pleasing feature of the export statistics recorded in Table No. 8 is the increased export of rimu, which was almost double the quantity shipped in 1932. In this connection, too, the trade has undoubtedly been stimulated by a delegation representing the West Coast rimu sawmillers which visited Australia during the year. If rimu continues to be exported at the same rate as now ruling, the 1934 figures will constitute the highest on record since 1924.

Exports to New Markets.—In addition to the English demand for silver-beech, which is expected to increase as the timber becomes better known, inquiries have also been received from South Africa and the United States of America. Taking all factors into consideration, the export of New Zealand timber should continue to increase steadily during the next few years.

4. Industrial Technique.

General.—In spite of the improved demand, most mills again operated at such a low percentage of capacity that few were able to invest in new or improved equipment. On the other hand, there is room for improvement in the adjustment and use of existing equipment to give more accurately and uniformly sawn timber, and officers of the Forest Service who were engaged in the supervision of the cutting and grading of timber for export to Great Britain report that a marked improvement was noticeable in both operations amongst sawmillers as they became familiar with buyers' requirements. The time is not far distant when the work of the Service should be reduced to the mere grade-marking of the timber to be exported.

Kiln Drying.—The value of artificial seasoning in producing well-dried, bright stock is being increasingly appreciated by the industry, and modern dry kilns were erected by Higgins and Fawcett, Hokitika, and Levett Bros., Harihari, for the drying of white-pine for box-manufacture, and by Wm. Smith and Co., Ltd., Invercargill, for the drying of building and furniture timbers. Although seven modern kilns are now in operation in New Zealand, only three concentrate on the drying of other than box timbers, and it is particularly desirable that further facilities be available for the kiln drying of building and furniture timbers. The use of local timbers could be considerably increased if adequate supplies of kiln-dried stock were readily available to consumers.

TABLE 5.

Reported Production of Rough-sawn Timber, by Species.

(From information supplied by the Government Statistician. All figures refer to the years ended 31st March, 1931–1933.)

Species.	1931.		1932.		1933.	
	Quantity.	Percentage of Total Quantity.	Quantity.	Percentage of Total Quantity.	Quantity.	Percentage of Total Quantity.
	Ft. b.m.		Ft. b.m.		Ft. b.m.	
Rimu	124,999,000	54·5	71,082,000	46·1	76,193,000	45·8
White-pine	49,009,000	21·3	43,161,000	28·0	47,998,000	28·9
Matai	13,917,000	6·1	7,475,000	4·8	8,161,000	4·9
Kauri	8,943,000	3·9	6,891,000	4·5	5,410,000	3·3
Totara	9,468,000	4·1	5,344,000	3·5	6,347,000	3·8
Beech	7,681,000	3·3	5,757,000	3·7	5,781,000	3·5
Insignis-pine	12,740,000	5·6	13,405,000	8·7	14,676,000	8·8
Miro	1,078,000	0·5	228,000	0·1	441,000	0·3
Tawa	455,000	0·2	163,000	0·1	290,000	0·2
Rata	294,000	0·1	122,000	0·1	72,000	..
Other	884,000	0·4	565,000	0·4	900,000	0·5
Totals	229,468,000	100·0	154,193,000	100·0	166,269,000	100·0

TABLE 6.

Reported Production of Rough-sawn Timber, by Provincial Districts.

(From information supplied by the Government Statistician. All figures refer to the years ended 31st March, 1931–1933.)

Provincial District.	1931.		1932.		1933.	
	Quantity.	Percentage of Total Quantity.	Quantity.	Percentage of Total Quantity.	Quantity.	Percentage of Total Quantity.
	Ft. b.m.		Ft. b.m.		Ft. b.m.	
Auckland	89,924,000	39·2	63,222,000	41·0	74,261,000	44·7
Hawke's Bay	9,566,000	4·2	10,430,000	6·8	7,647,000	4·6
Taranaki	2,860,000	1·2	2,146,000	1·4	1,980,000	1·2
Wellington	25,495,000	11·1	15,183,000	9·8	15,157,000	9·1
Marlborough	6,842,000	3·0	5,031,000	3·3	3,374,000	2·0
Nelson	5,747,000	2·5	4,833,000	3·1	5,651,000	3·4
Westland	50,785,000	22·2	34,256,000	22·2	38,773,000	23·3
Canterbury	3,033,000	1·3	2,854,000	1·9	2,817,000	1·7
Otago	8,290,000	3·6	4,017,000	2·6	2,969,000	1·8
Southland	26,926,000	11·7	12,221,000	7·9	13,640,000	8·2
Totals	229,468,000	100·0	154,193,000	100·0	166,269,000	100·0

TABLE 7.

IMPORTS OF SAWN TIMBER AND OTHER FOREST PRODUCE.

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1931–1933. Value represents value in country of export, plus 10 per cent.)

Item.	1931.		1932.		1933.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Hardwoods—	Ft. b.m.	£	Ft. b.m.	£	Ft. b.m.	£
Australian hardwoods ..	9,707,000	118,850	2,883,000	35,040	7,149,000	89,890
Oak	716,000	17,870	893,000	13,010	1,040,000	13,650
Totals	10,423,000	136,720	3,776,000	48,050	8,189,000	103,540
Softwoods—						
Douglas fir	2,950,000	13,590	1,181,000	8,000	1,338,000(1)	8,660
Butter-boxes	2,879,000	38,160	1,473,000	19,070	1,815,000	24,480
Redwood	1,028,000	11,320	292,000	4,080	461,000(1)	4,660
Cheese-crates	732,000	6,830	175,000	1,510	5,000(2)	40
Hemlock and spruce ..	662,000	5,710	29,000	280	55,000(3)	550
Totals	8,251,000	75,610	3,150,000	32,940	3,674,000	38,390
Other	199,000	6,230	80,000	2,650	48,000	2,040
Grand totals ..	18,873,000	218,560	7,006,000	83,640	11,911,000	143,970
	Number.	£	Number.	£	Number.	£
Laths, palings, shingles, &c.	1,727,000	4,120	1,800,000	2,110	1,400,000	2,040
	Tons.	£	Tons.	£	Tons.	£
Tanning-barks	1,166	11,930	2,552	28,300	1,850	20,450
Wood-pulp	3,814	31,810	3,100	23,240	4,270	30,550

(1) Low imports due to reduced building activities. (2) Active competition of insignis pine and white-pine has accounted for this decrease. (3) Active competition of insignis pine for export fruit-cases has accounted for this decrease.

TABLE 8.

EXPORTS OF SAWN TIMBER(1) AND OTHER FOREST PRODUCE.

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1931–1933.)

Item.	1931.		1932.		1933.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ft. b.m.	£	Ft. b.m.	£	Ft. b.m.	£
White-pine(2)	14,807,000	136,450	22,264,000	199,680	19,533,000	181,030
Rimu(3)	929,000	6,860	2,061,000	14,230	3,642,000	24,560
Beech(4)	740,000	9,510	1,475,000	15,210	1,375,000	12,710
Kauri(5)	451,000	12,740	674,000	17,230	411,000	10,660
Insignis pine(6)	418,000	5,100	619,000	5,930	692,000	7,120
Other(7)						
New Zealand	189,000	1,970	194,000	1,610	176,000	1,430
Foreign	19,000	280	5,000	130	11,000	120
Totals	17,553,000	172,910	27,292,000	254,020	25,840,000	237,630
	Tons.	£	Tons.	£	Tons.	£
Kauri-gum	3,058	128,090	2,068	62,410	3,089	77,970
Tanning-bark	55	690	..	..	18	90
Fungus	92	9,990	67	5,944	56	3,400

(1) 96 per cent. exported to Australia; remainder to Pacific Islands and United Kingdom. (2) Exported for butter-boxes, shelving, whitewood furniture, &c. (3) For flooring and linings. (4) For motor bodies, agricultural implements, and wood turnery. (5) For flooring, linings, tanks, vats, &c. (6) Fruit-cases for Pacific islands. (7) Mainly matai for flooring and linings for Australia and Great Britain.

CHAPTER V.—GENERAL.

1. Legislation.

The only legislation which affects the Service is contained in the Reserves and other Lands Disposal Act, 1933. Sections 7 and 8 of the Act changed the reservation over a total area of 686 acres in Marlborough Land District, being Sections 1A and 8A, Block VIII, Wakamarina Survey District; Section 43, Block VIII, and Section 1, Block XI, Heringa Survey District; and Section 33, Block IX, Wakamarina Survey District; from provisional State forests to Scenic Reserves.

Section 12 enacted a similar change with respect to an area of 277 acres 2 roods 27 perches in Nelson Land District, being Section 23, Block VII, Kaiteriteri Survey District.

Section 14 changed the reservation over an area of 37 acres 2 roods 6 perches in Otago Land District, being part Section 28, Block X, Woodland Survey District, from a provisional State forest to recreation purposes.

Section 17 changed the reservation over 1,900 acres in Southland Land District, being part of Run 441, Manapouri Survey District, from a provisional State forest to National Park purposes.

2. Finance.

Receipts.

Receipts from all sources for the financial year ended 31st March, 1934, amounted to £52,709. Details, together with comparisons with the previous two years, are appended:—

TABLE 9.

Item.	1933–34.	1932–33.	1931–32.
Indigenous-forests receipts—	£	£	£
Timber-sales	31,017	27,129	36,320
Timber royalties and trespass	3,164	3,667	3,751
Leases, grazing	1,816	1,637	1,704
Sawmill-sites, industrial, &c.	1,348	1,412	1,865
Miscellaneous	2,206	1,587	2,249
National Endowment Account allocation	6,612	6,221	6,391
Nurseries and plantations—			
Trees and seeds	6,546	3,542	3,278
Firewood and poles			
Miscellaneous			
Totals	52,709	45,195	55,558

The increase in revenue as compared with last year indicates that the position in the sawmilling industry is gradually showing signs of improvement, which is also evidenced by an increase in the number of mills working full time and the reopening of others which had suspended operations.

Payments.

The net expenditure from the State Forests Account for the financial year ended 31st March, 1934, was £116,386.

A summary showing payments under the main subdivisions is appended, together with the corresponding figures for the years 1931–32 and 1932–33.

TABLE 10.

Item.	1933–34.	1932–33.	1931–32.
Fixed charges and staff salaries—	£	£	£
Interest and expenses of raising loans	269*	97,256	90,223
Staff salaries	32,901	34,232	40,974
Allocation of revenue—			
National Endowment Account	3,893	3,840	6,337
Local-body payments	3,508	3,259	6,416
Management, establishment and development—			
Indigenous forests	8,817	9,501	12,893
Fire-fighting equipment and prevention	820	668	1,578
Educational: Reference library, &c.	120	411	276
Research and experimental equipment, &c.	1,022	1,017	1,199
Afforestation: Nurseries and plantations	54,292	49,348	107,795
Land-purchase	10,542	12,646	6,874
Miscellaneous	202	205	502
Sand-dune reclamation	..	..	110
Totals	116,386	212,383	275,177

* Note.—Interest on loans is now being carried forward as a liability to the Consolidated Fund until realization of the plantations.

3. Unemployment Relief.

The arrangements made with the Unemployment Board last year in regard to the employment of relief workers again obtained during the year under review, and at the height of the planting-season in August 1,208 relief workers were employed in the various plantations controlled by the Service; this included a number of married men for whom employment was found.

During the summer months the services of 670 men were retained and they were employed on road and firebreak construction, thinning operations, and the preparation of land for the 1934 planting-season. With the addition of a semi-permanent complement of 180 men engaged throughout the year, the Service has greatly assisted in the alleviation of the unemployment problem.

4. Issue of Free Trees and Seeds.

In co-operation with the Unemployment Board the issue of trees to local bodies, at a charge covering packing and carriage costs only, was continued during the 1933 planting-season. Seventy-three orders were supplied with 751,025 trees, valued at £3,754.

Fewer local bodies availed themselves of the opportunity of obtaining free trees, and the number supplied was less than half of the 1932 total, the number of individual orders, seventy-three, also being considerably less than last year's total of 127. This was largely due to the limited range of species available.

During the past two tree-planting seasons most of the trees issued have been absorbed by those local bodies carrying on afforestation as a regular activity, which indicates that the trees were necessary to supplement their own nursery stocks to meet the requirements of increased planting programmes undertaken to provide additional relief to the unemployed in the various localities concerned.

Schools.—It is estimated that 250 schools received free grants of 26,808 trees, valued at £157, while 141 lb. of tree-seed of sixteen different species, valued at £142, was issued gratis to 450 schools.

5. Recreation in State Forests.

The popularity of tramping, mountaineering, &c., still continues, and it is known that the active membership of clubs organized for this purpose throughout the Dominion now runs into four figures. The improved roads and access tracks to and within our native forests have encouraged visitors to explore parts which, but a few years ago, were *terra incognita* to all but the adventurous few, and during the summer months especially, forest field officers report that campers in increasing numbers now spend their annual recreation in the healthful environs of mountain, bush, and stream. A case in point is the new access road to Eglinton Valley, Southland, which was visited last summer by upwards of one thousand motorists.

The presence of these visitors necessitated increased vigilance on the part of fire patrols, but very few cases of careless fire-lighting, acts of vandalism, &c., were recorded; the good will and co-operation of the general public in this respect are gratefully acknowledged.

6. Honorary Forest Rangers.

During the period under review six new appointments were made, bringing the total number of honorary forest rangers to 146.

The Service is pleased to accord again its appreciation of the voluntary help and co-operation tendered gratuitously by honorary forest rangers.

The officers concerned are largely appointed for specific localities, and their supervision over State forests situated in remote parts of the Dominion is an important factor in the protection of those forests from fire and the suppression of vandalism and trespass.

Certain local authorities have also taken the opportunity to enlist the provisions of the Forests Acts, 1921–22, to protect their areas from fire, and, for that reason, certain members of the authorities concerned have had to be appointed honorary forest rangers, as the authority for the issue of permits to light fires in fire districts is vested in forest officers by that Act.

APPENDIX.

SUMMARIZED REPORTS ON STATE AFFORESTATION.

Auckland Region.

Nurseries.—In accordance with the decision arrived at the previous year, seed-sowing in Whangamata Nursery (Tairua Plantation) was discontinued, and the area was planted up with a mixture of *Sequoia sempervirens, C. Lawsoniana, and Pseudotsuga taxifolia.* Riverhead Nursery is also practically closed and the land has been leased temporarily for grazing purposes.

At Wharekawa Nursery (Tairua Plantation) a sowing of 447 lb. of seed, comprising 70 per cent. *P. ponderosa,* 20 per cent. *P. radiata,* and the remainder mainly *P. palustris,* produced 1,740,000 seedlings; at Waipoua Nursery 148,600 young trees were raised from 70 lb. of seed, cheifly *P. Pinaster,* while at Riverhead 35,000 seedlings (*P. radiata*) resulted from a sowing of 5 lb. of seed.

In some instances germination was retarded by dry weather, and at Wharekawa Nursery considerable damage was done by a severe gale which sprang up soon after several plots were sown.

Plantations.—During the planting season low rainfall was experienced, followed by a dry summer, and this accounted for some losses amongst the planted stock at Riverhead. Exceptionally rapid and healthy growth is being made by *Pinus Taeda* at this station. *P. echinata* and *P. Pinaster* are also coming away well, and after a slow start *P. Laricio* and *P. ponderosa* are now showing up above the scrub and bracken, and promise well.

The season's planting at Tairua resulted in a fair strike, with the exception of *P. radiata,* which was disappointing, due apparently to the severe climatic conditions at the time of planting. At Maramarua Plantation *P. radiata* is making rapid growth, and all other species have a healthy appearance and are making good progress.

At Waipoua *P. palustris* and *P. echinata* are doing well, but *P. Taeda* and *P. caribaea* are not so impressive.

Rotorua Region.

Nurseries.—The tree crops at both Rotorua and Wairapukao (Kaingaroa Plains) made satisfactory progress in spite of variable weather conditions, and less damage than usual was caused by grass grubs. From the former nursery 14,211,000 trees were lifted and from the latter 4,807,900. The great bulk of this stock was planted out on Kaingaroa Plains.

In October and November 1,934 lb. of seed was sown—350 lb. in Rotorua Nursery and 1,584 lb. at Wairapukao—and resulted in a total crop of 9,549,000 seedlings. This total should be increased by including 16,200 poplars (raised from cuttings) in Rotorua Nursery.

The estimated number of trees in all nurseries is 31,700,000, of which approximately 14,780,000 are required for planting during the current season—8,080,000 are required for 1935 planting, and the remainder is available for disposal elsewhere.

Plantations.—Planting was completed on Run 60 (with the exception of two compartments) and on that portion of Run 90 to the north of Napier–Taupo Road, a total of approximately 23,160 acres being dealt with, using 15,666,900 trees—an average of 676 trees per acre. The weather during the planting period was variable; eighteen successive frosts were experienced in June, with good rainfall in July and August, followed by drying winds in September and October. Blanking was carried out on an area of 2,250 acres.

The main species used on the new area planted were *P. ponderosa,* 47 per cent.; *P. Laricio,* 28 per cent.; *P. Murrayana,* 8 per cent.; *Pseudotsuga taxifolia,* 8 per cent.; and *P. Strobus,* 7 per cent.

Wellington Region.

Nurseries.—No seed was sown, and nursery work was confined to general maintenance, wrenching, lifting, &c. Under the latter head 1,803,100 trees were absorbed for local planting, while 16,600 were despatched to various local bodies, schools, &c.: total, 1,819,700. Tree stocks in hand at the close of the year aggregated 895,200.

Plantations.—Planting was continued on the Erua project, and 296 acres was reforested with three-year-old *P. ponderosa,* the strike being very satisfactory, and the mortality only about 1 per cent.; 153 acres were planted with *Thuya plicata,* making a total of 449 acres.

At Karioi planting commenced at the end of May and concluded at the end of October. The following areas (in round figures) were dealt with: New planting, 1,200 acres; blanking, 2,430 acres; replanting, 552 acres. The species principally used were *P. ponderosa, P. Murrayana,* and *P. Laricio.*

With the exception of the last 300 acres planted, which suffered owing to some weeks of dry weather, the strike was very good.

Nelson Region.

Nursery.—In Golden Downs Nursery a sowing was made of 267 lb. of seed, mainly *C. macrocarpa, Pseudotsuga taxifolia, C. Lawsoniana,* and *P. Pinaster;* 1,958,600 trees were lifted, and 379,600 lined out. Sowing commenced on the 16th October and ended early in December; high winds caused considerable delay in this operation.

Plantations.—The planting-season began on the 8th May and ended on the 21st October. Climatic conditions were favourable, and the total area planted was 2,281 acres, the predominating species being *P. Laricio* (934 acres), *Pseudotsuga taxifolia* (768 acres), and *P. ponderosa* (382 acres). Nine compartments were blanked, 79,800 trees being used for this purpose.

Deer caused a fair amount of damage in parts of the plantation adjoining the native bush where they take refuge. Special measures will be taken early in the new year to deal with this pest. Rabbits were also something of a pest, and hares appear to be increasing. Noxious animals destroyed were fifty-three deer, forty-three pigs, and a large number of rabbits.

At Dumgree Plantation the main work of the year was clear felling inferior patches of pine and larch, which will be sold for firewood; 6 acres was replanted with *P. radiata* and 2 acres with *P. muricata*. Work will be continued this year on a small scale to replant felled and unstocked areas.

Westland Region.

Nursery.—With the exception of some experimental sowing, the work in the nursery was confined to general maintenance and routine operations. Of the trees lifted—viz., 913,000—the major quantity (344,000) was used for the plantation, and a considerable number was despatched for planting at Golden Downs.

Plantation.—The planting of 272 acres was carried out with 344,000 *Thuya plicata*, with an espacement of 4 ft. in lines 8 ft. apart. Four-year-old locally raised stock was used, and a strike of 95 per cent. was obtained. The ground was typical cut-over forest with a dense second growth, and line-cutting was necessary as a preliminary step to planting.

Canterbury Region.

Nursery.—Operations under this head were practically confined to Balmoral Plantation, where the available stock at 31st March was 1,980,000 trees. 1,684,800 trees were lifted and 207 lb. of seeds was sown, the estimated crop being 1,157,000; of the first-mentioned number 1,527,000 trees will be retained for local use, 43,000 will be available for disposal for local-body planting, &c., and 410,000 are being held for 1935 planting. From Eyrewell field nursery 51,000 rooted *Populus serotina*, obtained from cuttings from good-type trees in Oxford district, were supplied to Southland Region.

Plantations.—New areas established were Balmoral Plantation, 31 acres (21,100 trees); Eyrewell, 88 acres (58,800 trees). These areas were made up of closed firebreaks, three-year-old *P. ponderosa* being used; a fair average strike was obtained. Reconditioning was carried out over a total area of 1,713 acres, being mostly hard grassy land at Balmoral and Eyrewell. Owing to the past few years of drought periods, these areas have been very difficult to establish. Pitting was essential, as three-year-old *P. ponderosa* was used, and it was necessary to get the large roots well down. Of the total area mentioned 132 acres was located at Hanmer Springs.

Southland Region.

Nurseries.—In the small field nursery at Beaumont a sowing was made of 76 lb. of seed, but the work was delayed by wet weather, and germination was affected by dry weather which followed. The main species represented were *P. ponderosa*, *C. macrocarpa*, and *Tsuga heterophylla*, and small quantities of eucalypts were also sown.

About 50,000 lined out *P. Murrayana* seedlings will be available for planting; 32,000 one-year-old *P. radiata* were lifted for planting and blanking. The estimated stock in the Beaumont Nursery is 233,000.

Approximately 16,000 poplar cuttings were prepared and lined out at Tapanui Nursery.

At Pebbly Hills 42 lb. of seed was sown, and it is estimated that 220,000 young trees will be available for future use. At this nursery 59,000 trees were lined out and 13,700 lifted.

Plantations.—Planting operations were: At Pebbly Hills, blanking 784 acres; at Blue Mountains, blanking 54 acres; at Conical Hills, replanting of 115 acres of poorly stocked spruce compartments with 47,000 *P. ponderosa*.

Cleaning of rank growth at Pebbly Hills covered an area of 594 acres, and was carried out by relief labour. This is a very necessary work as, owing to rank growth, many of the young trees would be suffocated if it were neglected.

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