

1937.
NEW ZEALAND.

STATE FOREST SERVICE.

ANNUAL REPORT OF THE DIRECTOR OF FORESTRY FOR THE YEAR ENDED 31st MARCH, 1937.

*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, 2nd September, 1937.

I have the honour to submit herewith the annual report of all operations of the State Forest service for the year ended 31st March, 1937, as required by section 64 of the Forests Act, 1911-22.

I have, &c.,

A. D. MCGAVOCK.

Hon. Frank Langstone,
Commissioner of State Forests.

Director of Forestry.

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REPORT.

INTRODUCTION.

THE following brief notes on some of the main activities of the Service are quoted for ready reference and general information. Most of the matters mentioned are dealt with in greater detail in the report.

Afforestation.—In round figures the area of exotic State forests now totals 426,000 acres, of which 331,000 acres are located in the North Island and 95,000 in the South.

At the close of the year plans were in train for the establishment of a new afforestation unit in the Bay of Plenty District, to be known as Rotoehu. It is expected that in the meantime about 24,000 acres will be available for tree-planting purposes in this locality.

Sale of Timber.—A busy year was experienced in dealing with the many applications received for blocks of milling timber, and the total volume sold—viz., 107,429,600 board feet—is 5,000,000 ft. greater than the figures for the previous year. The stumpage value of the timber sold was £124,500. To cope with the increase in work, much of which was urgent, as many sawmillers make no move to secure extra bush until their present holdings are practically cut out, the resources of the Service field staff were taxed to the utmost. It is all the more pleasing to record that at the close of the year the work generally was well up to date. The new year commences with a slight easing of the position so far as the demand for milling timber is concerned.

Production of Timber.—An increase in the quantity of timber produced must also be reported, the estimated volume—320,000,000 ft.—being about 20,000,000 ft. greater than the previous year's total.

The quantity cut from State forests (including Wardens' areas) was 111,700,000 ft., or about 37 per cent. of the total cut.

Exports of Timber.—The calendar year's figures showed a reduction of over 12,000,000 ft. in exports, the totals being—1935, 39,642,000 ft.; 1936, 27,026,000 ft. Kauri was the only species to show an increase over the previous year.

Rather unexpectedly the export of insignis pine (box-shooks) dropped by 700,000 ft., but it is believed that this decline is of a temporary nature only.

Imports of Timber.—The quantity of timber imported for the calendar year 1936 (31,126,000 ft.) was practically the same as for the previous year, but the value increased by approximately £28,000.

Whilst the imports of American softwoods increased by 2,300,000 ft., hardwoods from Australia decreased by practically the same figure.

Sawmills.—At the 31st March, 1937, the number of sawmills in the Dominion was 594, or two less than the previous year's total. Of this number, 504 were milling indigenous timber, and 127 were cutting exotic timber. Included in the latter figures are thirty-seven mills which at varying periods throughout the year milled both exotic and indigenous timber. The position of the industry may be gauged from the fact that the number of mills working full time rose from 315 to 345. Sawmills cutting State-forest timber numbered 138, as against 142 for the year 1935-36.

Opossum-trapping.—Opossum-trapping is subject to the provisions of the Animals Protection and Game Act, 1921-22, and the State Forest Service is concerned solely with the right of entry into State forests by duly licensed persons.

To facilitate this activity, and also to regulate the traffic in State forests, permits to enter for opossum-trapping must be obtained before licenses to trap can be granted in terms of the Act mentioned. Such permits are keenly sought in favoured localities, and a uniform system of allocating rights was deemed essential in the interests of all concerned. This has been achieved by subdividing State forests into blocks which are defined by natural features and offered annually for opossum-trapping purposes by public competition. Under this system permits are granted for one season only.

Three hundred and thirty-four permits to enter State forests for trapping purposes were granted for the 1936 opossum-trapping season.

Mining Privileges.—The number of applications for mining privileges in State forests continues to decline, due no doubt to the fact that many miners and prospectors are being absorbed into industries or employment of a more permanent and lucrative nature. The total applications handled by the Service for the year was about 50 per cent. less than for the previous period.

Forest Fires.—The months of summer and early autumn are usually anxious times for the forester, but last year was an exception to the rule, as frequent and well-distributed rains over most parts of the Dominion reduced fire danger to a minimum. One serious fire did occur, however, at Kaingaroa State Forest, spreading from the adjoining country into the growing trees. It destroyed 107 acres of nine-year-old insignis-pine trees, and, but for an excellent save by a large gang of fire-fighters, a major catastrophe might have occurred.

Full inquiries failed to discover the origin of the fire.

General.—At the close of another arduous and exacting year I desire to express my thanks to officers of all ranks for their fullest co-operation in furthering the policy of the Government and promoting the aims of the Service; when, as not infrequently happened, officers were compelled in the execution of their duties to work long hours, this service was invariably given with a good will and cheerfulness which merit the highest commendation.

Without the assistance of such a loyal, energetic, and competent staff the results as recorded in the pages which follow could not possibly have been achieved.

FOREST POLICY.

Two factors have developed during the period under review which, although with only minor effect on the long-term forest policy of the Dominion, have considerable influence upon the national forest activities of the immediate future.

Exotic Forest Establishment.—The exotic forest establishment programme initiated in 1925 was prompted solely as a protective measure against a future shortage of New-Zealand-grown timber for local use, and the interim concentration of staff and funds on this project has been dictated by the urgent necessity for establishing a capital resource adequate to the requirements of the Dominion. The necessity for revising the initial programme to provide a greater degree of safety against widespread failure of individual species by establishing a wider range of species than originally contemplated has been referred to in previous annual reports. While the position has been improved year by year, the proportion of *Pinus radiata* stands is still excessive and requires correction by further plantings of other species.

Under the pressure of urgency both the initial and the revised programmes were carried out with the broad national objective as the dominant consideration. The formation of extensive planting units was the keynote of the national forestry effort for over ten years, but with the work approaching completion it has been possible to give special consideration to the interrelated questions of regional planning and multiple land use, the objective of which is to secure an appropriate balance between agriculture, forest, watershed, and other uses in individual localities so that the natural resources of the Dominion may be developed to yield their maximum economic and social values.

Forest Community Planning.—The local land-use problem is only one phase of the land-settlement question and one which hitherto has been given little systematic study. The major agricultural land units tend to group themselves into two broad classes—the lowland, in which high soil fertility indicates intensive farming as the basic solution of its settlement problem; and the upland, in which topography and low soil fertility point to the continued development of extensive as opposed to intensive farming. Overlapping both, of course, is a huge area of relatively low fertility, for the development of which there appears to be no alternative but controlled tenant farming by the State. Major forest land units fall likewise into two broad classes—first, the lowland submarginal agricultural lands which may be regarded as the forest or timber-cropping lands of the Dominion; and, second, the upland or protection forest lands comprising that portion of the high country which, without forest cover, would erode rapidly with subsequent damage to the agricultural lowlands. Interspersed, however, amongst these more or less clearly demarcated major agricultural and forest areas are numerous land units, some relatively large and some small, in which the various classes of agricultural and forestry land are so inextricably combined as to constitute a problem all their own.

Peculiar as these conditions may be, it is believed that a number of local units exist where the problem of multiple land unit is capable of immediate solution. The inherent advantage of many such units is that, either wholly or to an overwhelming extent, the land remains in public ownership, leaving the way open for intelligent land-use planning. By segregating the various classes of land, by combining the advantages of controlled individual enterprise and tenant farming, by the State growing of specialized agricultural crops requiring a high degree of technical supervision, and by the establishment of State exotic forests a promising solution to the use of these local land units is available, and an initial demonstration area has been selected at Pongakawa, in the Bay of Plenty District. The area is to be known as the “Rotoehu State Forest,” and within the enclosing boundaries there will be carried on dairy-farming, grazing, tobacco-culture, the growing of exotic forests, and the milling and replenishment of indigenous forests. The area devoted to culture of tobacco and exotic forests will be bounded to the north by a district of intensive dairy-farming and to the south by a district of indigenous sawmilling. The primarily significant point is the attempt to weld tobacco-culture, with its slack winter season, into a single unit with exotic afforestation, with a busy winter season. The neighbouring farming and sawmilling communities must incidentally profit by this novel community which will occupy the “No Man’s Land” that normally separates them. The benefits to all concerned are very real—to the Dominion in the creation of a stabilized community, to the settlers in the provision of good roads and adequate institutional services hitherto lacking because of prohibitive costs, to forestry and nearby agricultural labourers in year-round employment by the dovetailing of farming and forestry work, and to the State Forest Service not only in permanence of labour personnel, but in a further opportunity to extend the use of species other than *Pinus radiata*.

Forest-community planning has therefore become a definite administrative objective, and a programme covering five years’ work is now in course of preparation with a view to making this project a major activity second only to the development of forest management in the kauri forests of North Auckland, the rimu pole-type forests of South Westland, and the beech forests of the Dominion.

Utilization.—In thus tending to increase the Dominion’s exotic forest capital resources an appraisal of the utilization aspect is fundamental to sound policy planning. With due provision previously made against substantial forest failures which might reduce seriously the supply of locally grown timber, the new programme would appear at first sight not merely to increase unnecessarily the factor of safety, but to create a surplus of raw material which might unduly depress the market. The danger is more apparent than real. Any marked surplus which is likely to eventuate will result from the large private plantings of *Pinus radiata* already made and will occur long before the proposed plantings of slower-growing species are likely to yield any utilizable material. With establishment concentrated upon slower-growing species than *Pinus radiata*, the basic result will be to create a more uniform supply of timber over the next century, thus assisting the supply position whether for domestic or export consumption, and therefore assisting in actual effect to achieve one of the fundamental objectives of forest management. To the Dominion also a surplus of disposable raw material over and above its own requirements is a substantial trading asset, and to the Government in particular, with its low cost establishment and maintenance charges, a potential source of considerable profit.

Far-reaching conclusions have emerged as a result of the world-wide experience of the depression years. Arising out of the frank recognition that under no system of economic planning is it possible to avoid altogether the fluctuations of Nature and of business, not the least important conclusion is that the amount of remunerative public works such as railways, hydro-electric generation, &c., available to absorb surplus labour at any period is strictly limited, if not tending to become almost negligible. Already it has been necessary to release considerable sums for many public works unremunerative either directly or indirectly, and with few exceptions the moneys have been in the nature of grants without any repayment of either principal or interest. If money could be made available on a similar basis for low cost exotic plantings by the State, a radical modification of the long-term forest policy aimed at the development of the Australian timber market in particular can be recommended.

As stressed in previous annual reports, the long-term forest policy of the Dominion has envisaged plantings to meet only the local requirements, a limitation imposed solely because, in place of grants from the Consolidated Fund, only loan-moneys, with their attendant high rates of interest, were available for exotic forest establishment. Under such conditions the growing of forest products for export markets was economically impossible, but with the limiting factor of interest removed the growing of timber for the Australian market becomes a feasible project. Of a certainty no other public activity offers for the amount of direct labour absorbed the creation of the same valuable future asset as exotic forestry. Increasing representations continue also to be made by Australian interests to the effect that, having regard to the unfavourable conditions in the Commonwealth for the growing of softwoods, New Zealand should make definite provision for supplying some part of Australia's requirements. It is for this purpose in particular that the expansion of State exotic forestry through its forest community planning project is dedicated.

Coincident with this expanded planting effort an active programme of utilization projects has already been initiated, and as a result of plans developed during the period under review a commencement will shortly be made with the construction of sawmills, box-factories, and creosoting-plants. These will form the nuclei of a number of completely integrated forest industries supplying ultimately a complete range of forest products from firewood to pulp and paper manufactures, and thus fulfilling the purpose for which the State exotic forests were originally established.

Export Control.—Although the threatened shortage of white-pine in the pre-war and war period played no inconsiderable part in the initiation of export control of timber towards the end of 1918, the building timbers—kauri, rimu, matai, and totara—soon became the primary concern of the administration. Lacking the present exotic forest policy, the Dominion was threatened with a dangerous timber shortage within a generation or so, and it was imperative that in the world-wide building boom of the post-war period the remaining resources should not be seriously impaired by the development of a large export trade with Australia. This was effected by severe and arbitrary restrictions upon the exports of building timbers, while in the case of white-pine exports were limited to only the surplus production over and above local requirements, Dominion consumers being assured of precedence over Australian and other export demands. With the development of the present exotic forest policy the position was eased in respect to building timbers, and when therefore the annual demand for softwoods fell from about 400,000,000 board feet in 1925 to only 300,000,000 board feet in 1927 the principle of export control was abandoned temporarily with the object of facilitating the disposal of surplus production on the overseas markets. The temporary nature of this expedient was stressed by public announcements throughout the Dominion's press, with particular emphasis upon the fact that, in view of the possibility of reinstatement of control at any time, no forward contracts should be entered into by producers. As a guarantee also that local demands would receive precedence over export orders, the sawmilling industry gave to the Government an undertaking to this effect, and on every occasion in the interim during which a shortage of supplies has threatened to develop not only has the industry reaffirmed this undertaking, but it has overcome the threatened shortage.

As mentioned in the annual report for the year ending 31st March, 1936, however, an investigation of the white-pine position disclosed the necessity for planning ahead to avoid a future shortage of essential requirements of this timber in both New Zealand and Australia. At that time it appeared that the white-pine resources were sufficient to warrant the continuation, at least for a few years, of exports sufficient to fill the export butter-box requirements of the Commonwealth, and in providing for the progressive restriction of exports to 19,000,000, 17,000,000, and 15,000,000 board feet for the years 1937, 1938, and 1939 respectively it was anticipated that no undue embarrassment would be caused to essential users either in New Zealand or Australia. These hopes, unfortunately, have not been realized, and even for the year 1936 the surplus available for export over and above local requirements amounted to only 15,000,000 board feet. This contraction in the estimates was due to the unexpected expansion in local butter production and to the rapidity with which white-pine supplies have diminished not only in the North Island, but also in the South Island.

With a still worse condition promising to develop during the next year there was no alternative to the reinstatement of export control, more especially as interim investigations aimed at a more detailed survey of the remaining resources disclose such a drastic reduction of the previous estimates that all hope of the continued export of other than a few million board feet per annum must be abandoned. Regrettable as it may be, this policy is dictated by the necessity for assuring to the butter industry one of its most essential raw packaging materials. In explanation it may be stated that the glaring overestimation of white-pine resources in the past on private lands arises from the fact that the species grows on rich river-flat lands, and whereas hitherto large stretches of forest on such lands were regarded as being almost wholly white pine, the more recent appraisals of previously inaccessible areas have limited the species to a mere fringe along the river-banks, with the forest interior largely of rimu. An effort to relieve this position, both as regards local and Australian butter-box users, by the development of rimu butter-boxes is alluded to in Chapter III of this report.

CHAPTER I.—MANAGEMENT.

1. AREAS UNDER CONTROL.

TABLE I.

AREAS OF STATE FORESTS AS AT 31ST MARCH, 1937.

Forest-conservation Region.	Permanent State Forests.		Provisional State Forests.		Totals.	Percentage of Total Area of Region under Reservation.
	Ordinary.	National Endowment.	Ordinary.	National Endowment.		
	Acres.	Acres.	Acres.	Acres.	Acres.	
Auckland ..	313,600	81,645	111,314	14,006	520,565	6·06
Rotorua ..	342,504	235,948	132,315	84,365	795,132	15·82
Wellington ..	970,811	65,891	38,231	7,649	1,082,582	7·23
Nelson ..	451,985	121,615	1,070,945	627,339	2,271,884	32·42
Westland ..	621,195	163,305	521,761	421,641	1,727,902	44·72
Canterbury ..	332,806	3,647	..	..	336,453	3·38
Southland ..	432,413	55,774	718,944	13,740	1,220,871	7·19
Totals ..	3,465,314	727,825	2,593,510	1,168,740	7,955,389	11·98

The foregoing table shows that the total area under forest reservation is now approximately 8,000,000 acres, or nearly 12 per cent. of the superficial area of the Dominion; the gross increase for the year was 61,884 acres, but when this is reduced by the area withdrawn (18,829 acres) and increased by certain corrections in previous figures (2,162 acres) the net increase is 45,217 acres.

Forest officers, in collaboration with officers of the Lands and Survey and Agriculture Departments, have, as other duties permitted, been steadily engaged throughout the year in examining blocks of Crown land which have definitely proved unsuitable for farming purposes, and as agreements are reached in this connection new areas are from time to time brought under the Forests Act.

It may be fitting to record here the thanks of the Forest Service for the valuable co-operation of the Departments mentioned in carrying out this work of forest and land classification.

The areas proclaimed under the Forests Act during the year are shown in forest-conservation regions in Table 2 which follows. Nelson Conservancy is responsible for the greatest area in this respect.

TABLE 2.

SUMMARY OF AREAS ADDED TO PERMANENT AND PROVISIONAL STATE FORESTS, 1ST APRIL, 1936, TO 31ST MARCH, 1937.

Region.	Permanent State Forests.		Provisional State Forests.		Total.
	Ordinary.	National Endowment.	Ordinary.	National Endowment.	
	Acres.	Acres.	Acres.	Acres.	Acres.
Auckland ..	3,963	..	164	..	4,127
Rotorua ..	..	..	1,328	..	1,328
Wellington ..	15,174	..	2,647	..	17,821
Nelson ..	35,300	..	3,138	170	38,608
Westland ..	..	..	..	..	..
Canterbury ..	..	..	..	..	..
Southland ..	..	..	..	..	..
Totals ..	54,437	..	7,277	170	61,884

As already stated, 18,829 acres were withdrawn from forest control during the year. It will be seen from Table 3 that the major portion of this area—viz., 16,417 acres—will not be denuded of its forest cover as it has been set aside for scenic purposes; of the remainder, approximately 2,300 acres were released for farm settlement.

TABLE 3.

SUMMARY OF AREAS WITHDRAWN FROM PERMANENT AND PROVISIONAL STATE FOREST RESERVATION, 1ST APRIL, 1936, TO 31ST MARCH, 1937.

Region.	For Settlement Purpose.		For Scenic Reserve.		For Stock Reserve.	For Aerodrome.	Totals.
	Permanent State Forest.	Provisional State Forest.	Permanent State Forest.	Provisional State Forest.	Provisional State Forest.	Permanent State Forest.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Auckland ..	143	14	317	..	..	..	474
Rotorua ..	..	..	100	..	11	3	114
Wellington ..	74	..	..	..	..	..	74
Nelson ..	47	..	..	6,025	..	..	6,072
Westland ..	..	1,610	9,715	260	..	..	11,585
Canterbury ..	..	..	..	..	..	..	..
Southland ..	..	510	..	..	..	..	510
Totals ..	264	2,134	10,132	6,285	11	3	18,829

2. PROTECTION FORESTS.

So much has been published in the press, broadcast over the air, and spoken from the public platform during recent months regarding the valuable functions performed by our hill-country forests and the vital importance of maintaining the forest growth thereon in its virgin state that it seems unnecessary to emphasize the point here. Moreover, the matter was dealt with at some length in the report for the year 1935-36, to which the inquiring reader is referred.

It may be stated, however, for public information that the area of protection forest was increased last year by the addition of 111,779 acres of bush provisionally reserved in previous years, but now dedicated as portion of our permanent forest estate. Of this total, 107,100 acres comprised hill country in Nelson Conservancy. This important work of building up and consolidating the permanent State forest domain will not be allowed to flag, but will be pushed forward until finality is reached, although the magnitude of the task precludes its being completed for some years to come.

3. FOREST RECONNAISSANCE, TIMBER CRUISING, SURVEYING, ETC.

Indigenous Forests.

Forest Reconnaissance and Forest Inventory.—In both Herekino and Omahutu State Forests (North Auckland) a complete inventory of kauri of all-age classes was made in order to compile a report for "managed" kauri areas. Field-work in Herekino was practically completed, but at Omahutu the field-work including topography and inventory of species other than kauri was being extended.

An inventory of the kauri area in Waipoua Forest was commenced and was being made in conjunction with a topographical survey.

A detailed reconnaissance of some 12,000 acres of forested area in South Westland was completed. This data will be used for the inauguration of a working-plan and selective-cutting management.

In Nelson and Southland Regions a total of 3,630 acres was cruised and estimated to contain 24,214,000 board feet of timber.

Demarcation.—Over thirty-eight miles of boundary-lines were defined.

Forest Roads.—A total of eight miles of forest roads were explored, graded, and constructed. Four miles of tracks were similarly dealt with during the year.

Timber Cruising.—In State and provisional State forests 12,200 acres, containing 109,886,000 board feet, were cruised. For other Government Departments 6,860 acres, carrying 46,399,000 board feet, were cruised, and 477 acres, comprising 6,111,000 board feet, were cruised for private owners.

Topographical Surveys.—The topographical surveys of the kauri-clad portions and of the cut-over kauri areas were completed in Omahutu and Herekino forests; at Waipoua forest 2,400 acres were similarly treated.

Tramway Traverses.—In order to keep record of the progress of timber-cutting operations 704 chains of bush tramways were surveyed.

Aerial Survey Photographs.—An aerial survey of some twenty-six square miles of State forest in the vicinity of Reefton was carried out by officers of the Royal New Zealand Air Force. Aerial photography is the only practical means of defining rugged bush-edges, tracks, streams, &c., in easy or mountainous country. Under present survey methods the data are obtained by laborious hours on the ground. It is anticipated that when equipment is improved and a higher technique developed greater use will be made of aeroplanes for air-inspections of forests and aerial surveying.

Exotic Forests.

Topographical Surveys.—Only 2,200 acres were surveyed topographically. At Whakarewarewa Plantation the field-work was completed early in the year. A topographical survey was commenced of Puhipuhi Plantation.

Topographical Engineering Survey.—At Whakarewarewa and Conical Hills Plantations topographical engineering surveys were made of proposed mill-sites. Plans on a scale of 1 chain to an inch were prepared to show contours at intervals of 2 ft.

Road and Track Construction.—Over fifty miles of roads were carefully located and constructed; three miles of tracks were formed.

Plantation Inventory.—Stocktaking at Waiotapu Plantation was completed, and at Hanmer Plantation an inventory of 2,800 acres was made. An inventory of Puhipuhi Plantation was commenced.

General.—To provide Balmoral Plantation with an adequate water-supply a preliminary survey of the old abandoned water-race was commenced. This old race starts at the Hurunui River and runs for fifteen miles through the plantation. The old intake was swept away during a flood, and as the bed of the river has been lowered measurements of the river were commenced in order to determine the lowest level of the river during dry spells of weather.

Some little time must necessarily elapse before these investigations can be concluded.

4. STATE AFFORESTATION.

Table 4, which follows, summarizes the position of the exotic State forests and is self-explanatory.

It will be seen that the only tree planting of any consequence was confined to the Rotorua Region, where 5,568 acres on Kaingaroa Plains were afforested, as compared with 11,152 acres in the same locality last year.

TABLE 4.
SUMMARY OF OPERATIONS IN PLANTATIONS AS AT 31ST MARCH, 1937.

Plantation.	Year of Commencement	New Area planted, 1936.	Total Net Area planted.	Gross Area of Plantation.
		Acres.	Acres.	Acres.
Waipoua	1925	294	1,364	12,600
Puhipuhi	1904	..	871	1,558
Riverhead	1926	..	11,029	11,956
Maramarua	1928	..	12,303	14,087
Tairua	1930	33	10,634	48,510
Whakarewarewa	1898	..	8,033	10,073
Waiotapu	1901	..	7,051	7,974
Kaingaroa	1913	5,568	259,193	327,931
Erua	1930	224	2,937	5,592
Karioi	1927	..	17,196	33,689
Golden Downs	1927	47	19,292	22,527
Westland	1922	..	3,000	5,839
Hanmer	1901	74	7,775	10,372
Balmoral	1916	311	21,074	24,000
Eyrewell	1928	34	18,340	19,266
Naseby	1900	..	3,009	4,032
Dusky	1898	..	4,470	6,866
Conical Hills	1903	..	3,612	3,798
Pukerau	1915	..	565	628
Blue Mountains	1925	..	8,775	9,661
Pebbly Hills	1930	..	4,353	5,330
Minor areas	1875-1935	116	1,287	6,492
Totals	..	6,701	426,163	592,781

5. SALES OF TIMBER.

The improvements in the sawmilling industry reported for the year 1935-36 continued during the year just closed, with the result that sales of milling timber under all heads (including Warden's areas) numbered 146; the volume of timber sold was 107,429,600 board feet and the value £124,522.

A great quantity of fencing material, posts, strainers, droppers, &c., firewood, and other miscellaneous forest produce was sold under splitting permits. A brisk demand for fencing-posts was particularly noticeable, due probably to the various Government and Native land development schemes; indeed, in certain parts of the North Island the retail price of posts has made their purchase almost prohibitive.

For comparison purposes the following table shows statistics of timber sales for the past five years:—

Year.	Number of Sales.	Quantity sold.	Sale Price.
		Board Feet.	£
1932-33	51	32,314,954	35,633
1933-34	83	49,026,302	52,118
1934-35	117	65,302,700	71,243
1935-36	130	102,219,800	131,447
1936-37	146	107,429,600	124,522

The total year's cut of milling timber from State forests, including Warden's areas, was approximately 111,700,000 board feet, an increase of 27,700,000 ft. over the figures for the previous year.

From all sources the volume of timber cut is estimated to be 320,000,000, of which 37 per cent. was cut from State forests and the remaining 63 per cent. from private and Native-owned forests.

6. WEST TAUPO TIMBER LANDS.

A Forestry officer continued the regular patrol of these lands, by arrangement with the Native and Lands and Survey Departments (*vide* report for 1935-36), and one case of trespass was reported to the Aotea Maori Land Board. These periodical inspections have resulted in the gradual suppression of the unauthorized tree-felling, vandalism, &c., which, unfortunately, was almost impossible of detection in former years owing to the isolation of the blocks and the lack of supervision.

7. WAITANGI ENDOWMENT.

As announced in previous reports, small-scale tree-planting was undertaken at this historic station pursuant to the provisions of the Waitangi Endowment Act, 1932-33.

During the year 58 acres were planted, making the total to date 239 acres.

At the request of the Trust Board 10 lb. of kauri-seed were sown in the nursery, with the result that about 40,000 seedlings were raised for the Board's use. Twelve pounds of *P. taeda* seed were also sown in the nursery, but only about 56,000 seedlings were obtained. "Damping off" was responsible for some damage to both species mentioned.

8. FOREST ATLAS.

This branch of the service experienced another busy year, being fully occupied in preparing new plans, keeping atlas sheets up to date, compiling topographical and species plans of the exotic State forests, &c., in addition to ordinary routine work. The new work included the preparation of four plans, 126 tracings, sixteen graphs, and the renewal of eight atlas sheets.

Eight new topographical plans and five new species plans of the exotic State forests were compiled, and additions made to thirty-eight other species plans. A set of aerial photographs of the Reefton District was obtained from the Defence Department, and a mosaic was made for departmental use.

CHAPTER II.—FOREST PROTECTION.

1. GENERAL.

The year's weather from the forestry point of view, has been less spectacular than in the preceding year, but still sufficiently distinct from normal to be quite satisfactory. North Auckland again experienced frequent and continuous rains without reaching any of the record figures alluded to last year. Each Auckland recording station showed between 20 in. and 30 in. decrease in rainfall, and Waipoua State Forest succeeded in recording 1,677 hours of bright sunshine, an advance of 250 hours on its previous year's total. At no time, however, did any prolonged spell of fine weather create an undue fire hazard in the North, and no fires occurred. Farther south in the Rotorua Conservancy fine winter weather with frosts continued somewhat later than usual and created an early fire hazard and permitted the spread of a scrub fire from private land into the main Kaingaroa State Forest on 26th September. This fire was the worst that has yet been experienced in this large exotic forest, and 107 acres of nine-year-old pines were destroyed before it was extinguished (see later description). Thereafter the season, although not nearly so wet as the previous one, had a very large number of wet days, and fire danger was far below normal for the summer. Similarly, for all other conservancies, it was a summer of hazard below normal, and, except for one fire in Hawke's Bay, which in early December spread through bush recently milled over, no fires at all of any moment occurred. This was particularly fortunate in respect of the large areas of protection forest devastated by the gale of February, 1936 (see last year's report). A dry summer would have made these areas very susceptible to large-scale fire damage, but, as it has turned out, green scrub and second growth has had a good chance to come away and has gone a long way towards making them comparatively fireproof.

It is also pleasant to record that during the damp spring and summer there occurred none of the late spring and summer frosts, which were so marked a few years ago. No signs of frost damage, therefore, were to be seen in either indigenous or exotic forests, and scarcely a case of *Phomopsis strobi* damage could be found in any pine forest.

On the contrary, those exotic forests in the more arid areas of the South Island received much heavier rains than usual and present an appearance of greater well-being than for several years past.

2. FOREST FIRES.

As already stated, the season was one of minimum hazard, and the only fires recorded were as follows:—

Rotorua Conservancy (107 acres—nine-year-old *P. radiata*).—The climatic conditions at the time of this fire have been discussed in the preceding paragraph. It is to be noted that it occurred four days before the commencement of the gazetted fire season, during which settlers are compelled to take certain precautions. It is also occurred during the week-end and at some distance from the State Forest boundary and no evidence was procurable as to its method of origin.

Wellington Conservancy.—One fire in old workings already described.

Nelson Conservancy.—Three settlers' fires spread to forest lands. In one case 30 acres of State forest was burned; in another 9 acres of scenic reserve, and in another 15 acres of privately-owned *Pinus radiata*.

Canterbury Conservancy.—One midnight fire of unknown origin destroyed the stable, carpenters' shop, and other outbuildings of Hanmer State forest. That it did not spread to either the adjoining office or the Ranger's dwelling was largely due to the co-operation between the staff and the local fire brigade. The liaison that is maintained between this volunteer fire brigade and the Forest Service was again fully tested, and the value of the services of a trained and equipped body of fire-fighters cannot be too highly emphasised. It is a pleasure to have this opportunity of recording publicly the value of the assistance rendered by this brigade, but the regrettable point is that no other State forest is so situated with a volunteer fire brigade in close proximity.

Another small fire in an inaccessible position ran through about 20 acres of protection forest mountain beech in this conservancy (Alford State Forest).

Auckland, Westland, and Southland Conservancies suffered no damage from forest fires, Southland having a season which enabled even the normal fire patrols to be dispensed with.

The comparative freedom from forest fires enjoyed by the State forests for some years past has been achieved only at the cost of a very considerable expenditure on regular patrols and maintenance of fire-preventive equipment, as well as of much public criticism incurred by the total exclusion of the public from planted areas. The policy of refusal of rights-of-way to both stock and vehicle traffic over many forest roads, and of exclusion of anglers where possible from streams, has been much criticized. It will therefore be of interest to quote from a recently published report from the British Forestry Commission on the position in Britain :—

“During the eight years 1929–36 about three thousand fires took place on Forestry Commission land. Half of these were caused by sparks from railway-engines and about 20 per cent. by the public. *The majority of fires thus caused by the public originated from roads or paths which were open to them* . . . 9,000 acres of plantations have been destroyed by fire, causing a loss of £100,000 (inclusive of the cost of extinguishing the fires).”

The public entry to British forests, then—despite the facts of the comparative docility of that public, of the smaller plantations units tending to distribute danger and so to minimize loss, and of the denser population giving more ready mobilization of fire-fighting forces—is stated to have destroyed 1,800 acres of plantation at a cost of £20,000 in eight years. New Zealand, with a fire hazard in all respects much more intense than that of Britain, cannot afford to incur risks and losses of this magnitude, and the State Forest Service feels that the British report quoted furnishes strong evidence in support of its present distasteful policy of total exclusion of the public from planted areas. It is but fair to add a grateful acknowledgment of the manner in which the body of the public observe the restrictions laid upon them in this matter as individuals ; the protests and criticisms being voiced mainly by organizations and societies.

3. FIRE DISTRICTS.

Two new fire districts (one private and one State forest) were constituted during the year, and both were in Wellington Conservancy. The private district embraced the well-known Flock House property and comprised an area of 10,700 acres ; the area of State forest included in the other new district was 227,250 acres.

The system of burning under permit, combined with the vigilant fire patrol of all exotic forests during the dry months, has been entirely responsible for the great reduction in the number of serious forest fires in recent years.

Settlers generally throughout the Dominion now realize the great danger which might arise from unauthorized burning and co-operate very well with forest officers by obtaining permits and by burning only when weather conditions are favourable. It can safely be averred that thanks to the forest fire legislation the reckless and indiscriminate burning so prevalent two or three decades ago is now a thing of the past.

4. ANIMAL DESTRUCTION.

The destruction of harmful animals in State forests was continued and resulted in a recorded kill of 44,157.

This total included 43,056 rabbits and hares and 978 deer. Other animals destroyed were sixteen wild horses on Kaingaroa Plains, and 103 pigs, twenty-four in Nelson Region and seventy-nine in Southland.

The total kill was somewhat lower than last year, due to the fact that the war against the rabbit pest in previous years is now bearing fruit in the reduced numbers to be found in the plantations. A plague of mice at Golden Downs (Nelson Conservancy) caused some damage to the newly-sown seed in the nursery last spring.

5. FOREST PARASITE BIOLOGY.

In the field no further symptoms of an alarming nature developed. On the contrary, it is satisfactory to be able to report that one or two phenomena which had been carefully watched rather abated and confirmed the original opinion that they were not of permanent significance. Reference has already been made to the absence of infection by *Phomopsis strobil*, a satisfactory condition partly due to the non-incidence of late spring and summer frosts, and partly to the measures which were taken over a period of years to replace *P. radiata* by immune species on certain sites. In the insect world, similarly, careful observations showed no recurrence of the epidemic of *Hybernia indocilis* larvæ on pines, and feeding and starvation tests by the Forest Entomologist proved that the larvæ could not feed on an unmixed diet of pine foliage. As the pines, therefore, closed canopy and crushed out the original host-plant (*Discaria toumatou*) the moth population was slowly starved and reduced to insignificant proportions.

Field recoveries were made during the summer at Hammer of *Rhyssa*, the parasite liberated to reduce the wood wasp (*Sirex*) population—a satisfactory result, proving at least a measure of parasite establishment.

During the year the Forest Entomologist was removed from Nelson, where he had for several years been housed and assisted by the Cawthron Institute, and was attached to the staff of the Head Office of the Forest Service. The Forest Mycologist similarly was located with the staff of the Wellington Conservancy instead of with the Plant Research Bureau, which was reorganized and transferred to other stations. Both officers are for this year co-operating on a programme of investigation of insect and fungal parasites of building timbers.

6. SILVICULTURAL OPERATIONS AND YIELDS FROM EXOTIC FORESTS.

The maintenance and improvement operations recorded in last year's report have been continued throughout the year in all of the older exotic forest stands. This has enabled a labour complement of between 1,100 and 1,200 men to secure year-long employment in State forestry.

The main results may be set out as follows :—

	Acres.
Area of cleanings (including low pruning and certain green pruning) ..	11,623
Area of high pruning	236
Area of thinnings	1,982

The gross revenue returned from exotic forest produce (including actual sales of produce with stumpage sales of mature areas) has been £4,773. In addition to this, the whole of the labour complement in camps has been supplied with free fuel, and fencing and telephone maintenance and erection material for the Service have been cut from these forests. The larger items of this exotic forest produce were :—

Final yields in saw timber sold	2,400,000 superficial feet.
Intermediate yields—	
Firewood sold	1,930 cords.
Poles sold	2,800
Posts and stakes sold	23,660
Special radio poles	83
Mine props sold	110,328
Rails sold	2,050

CHAPTER III.—UTILIZATION.

1. GENERAL.

The year ending 31st March, 1937, has been characterized by an extraordinary expansion in the scope of forest utilization activities. Not only has it been necessary to formulate plans for the establishment of a number of virtually new industries essential to the development of the exotic forest policy, but, acting on the instruction of the Hon. the Commissioner of State Forests, the forest utilization staff has been associated with officers of the Department of Industries and Commerce in Dominion-wide investigations into the prices of practically all classes of forest products, in the administration and operation of an export butter-box pool, and in organizing the supply of other classes of export containers to the various industries.

(a) Prices.

The active interest of the Government in prices of all commodities is a natural corollary to its labour legislation, the objective of which would be defeated if the increased wages assured to the working community were more than offset by increased prices, thus reducing real wages while increasing money wages. As a raw material entering intimately into the everyday life of the community it was inevitable that attention should be directed towards increased timber prices, more especially as the present period represents the first occasion on which demand has approached normal since a prohibitive timber tariff was enacted in 1929.

The Timber Price Committee set up to investigate prices of timber and other forest products was unanimous in its recommendation that every effort should be made to avoid price-fixation. Considering the rapidity with which both demand and economic conditions tend to change within the timber industry, the Committee was of the opinion that a greater element of elasticity was desirable in the price-structure, and the Government adopted accordingly the alternative policy of negotiating standard prices representing a fair return to efficient producers operating reasonably capitalized mills.

The problem of arriving at standard prices, fair alike to producer and consumer, has been a most difficult one. In accordance with the general policy of the Government, the Committee was limited at the outset to negotiating price increases which covered only the direct and indirect costs arising out of the 1936 labour legislation. This limitation tended to work to different effect in various districts. While, generally speaking, the industry was commencing to experience a seller's market for the first time in eight years, only in a few districts had there occurred any price increases which reflected this market condition. In such cases the standard prices agreed upon between the industry and the Government have been sufficient to enable efficient operators with reasonably capitalized units to carry on profitably. In other regions where price increases prior to the labour legislation have not occurred it has been necessary to recognize that the original increases limited to take account of the direct and indirect costs of production necessitated by the 1936 legislation were insufficient to place the industry on a reasonable profit-earning basis.

Considering the enormous losses suffered by the timber industry during the depression years, the increase in realization secured to sawmills by the new prices and ranging between 2s. 9d. and 3s. 9d. per 100 ft. board measure according to locality, &c., cannot be considered other than reasonable. Merchants' prices likewise had to be adjusted to take account of increased operating charges, but in many instances the passing on to the public of the whole of the sawmillers' increase was avoided by the fact that merchants' lists had not been reduced during the depression years to the same extent as sawmillers' lists.

Not unnaturally difficulties have been experienced in the necessary negotiations with the industry, but, having regard to the far-reaching effects and implications of price-control, it is a striking tribute to the constructive attitude of its representatives that the result, representing a considerable saving to the consuming public and therefore at the expense of the industry, has been secured by a spirit of amicable negotiation. As the most promising offset against this sacrifice the industry has freely accepted the view of the Government that only by keeping prices as low as possible consistent with a fair return to the producer can a healthy tone be maintained in the building trade, thereby keeping the demand for timber at its present remunerative level. Few other industries are subject to the same proportionately high overhead charges as the timber trade, and for this basic reason the industry is lending every effort to assist the Government in implementing a building policy which will maintain its units at a high operating ratio. It is hoped that the industry's anticipations will be realized.

(b) Export Butter-box Pool.

Numerous factors combined during the year to threaten a serious shortage of white-pine boxes for the export of butter, and to relieve the position approval was given to the import of 600,000 spruce boxes in shock. So acute was the situation at one time that a number of dairy factories were reduced to one day's supply of boxes, and the box-factories to only three weeks' supply of timber. Arising out of this position the Government decided that some central authority should be created for the purpose of regulating box-supplies and of disposing of them at a uniform cost to dairy factories. It was therefore arranged that the New Zealand Dairy Board should operate an export butter-box pool, the necessary authority being conferred upon it by regulations issued under the Agricultural Emergency Powers Amendment Act, 1936. Under these regulations the Government Timber Price Committee, acting as adviser to the Minister of Agriculture, negotiates standard prices for the various types of packages with the butter-box manufacturers, the Dairy Board subsequently charging out these different boxes to dairy factories at predetermined prices. Considering the chaotic conditions under which this Pool was formed, its working has proved remarkably successful. Destructive fires in two butter-box factories amply demonstrated the value of the organization built up by the Board and the New Zealand Boxmakers' Association, under which emergency supplies were available from other manufacturing units without embarrassment to any of the dairy factories affected.

The acute shortage of white-pine which developed during the year has become accentuated with every passing month, and, if for no other reason, some form of organization such as that now built up in connection with the butter-box Pool would have been required in any event to allocate the necessary supplies of timber to the various boxmaking units throughout the industry and to see that these were secured at a reasonable price. Again, it cannot be overemphasized that the dairy industry has had a very valuable consideration conferred upon it under the operation of this Pool. Had it not been for the enforcement by the Government of its policy that not only should local demands for white-pine have precedence over export, but that New Zealand consumers of white-pine should not be required to pay export parity but only a fair return value to the producers, the dairy industry would have been compelled to pay, for boxes of a quality comparable with those now being manufactured, at least 3d. per box more than during last season, irrespective of whether or not the labour legislation of 1936 had been introduced.

Neither can the outstanding merits of white-pine as a butter-box container be ignored. Its possession is a valuable marketing asset to the New Zealand industry in competition with other countries, which is clearly demonstrated by the fact that Australian users have been prepared to pay heavy increases in price to secure supplies.

(c) Organization of Fruit-case Supplies, &c.

Organizing the supply of export-fruit cases and cheese-crates has also occupied considerable attention by the Timber Price Committee. Working in conjunction with the New Zealand Boxmakers' Association, no difficulty was experienced in providing an adequate supply of cheese-crates, these now being manufactured from a wide variety of both indigenous and exotic timbers. Due to the existence of old contracts, however, anomalies were experienced in the delivered price of cheese-crates to various dairy factories. With a view to removing these and securing crates at the lowest possible cost to the industry, various proposals will probably be advanced for the formation of a cheese-crate pool, but it is not unlikely that the majority of consumers will prefer to be left free to conclude their own arrangements even at a higher price than could be secured by the operation of a pool.

The organization of the export-fruit-case supplies has been left, as in former years, in the hands of the New Zealand Fruitgrowers' Federation, the Government co-operating where required to secure agreement upon prices, &c. During the year an import of 300,000 boxes was approved for the purpose of avoiding any local shortage, but these did not arrive until late in the season and the carry-over for the 1937-38 season is about 230,000. A number of local shortages developed during the year largely as a result of the failure of growers to place orders well in advance for their requirements. Although causing some temporary embarrassment, these shortages were eventually overcome without serious results, but to avoid a recurrence of the trouble arrangements have been concluded with the New Zealand Fruitgrowers' Federation for the complete ordering of the whole of the 1937-38 requirements from local box-manufacturers by the 1st July. By this means it will be possible to spread production over the greater part of the year and ensure various economies in production which will be reflected in lower prices. As a result of the carry-over of imported shocks already referred to no imports are contemplated for the forthcoming season.

(d) Conclusions.

Arising out of the activities reviewed above it is pertinent to comment generally upon the various effects of the labour legislation of 1936. One of the first and most important observations is that the ruling prices of most timbers, after providing for all increases, are only at about the 1929-31 level—to which the award rates were raised—whereas all timber products are bearing a much higher labour charge arising out of the fact that the wages are spread over only forty hours as compared with anything from forty-four to fifty-six hours in the earlier period. If the comparison is related to still earlier years of the immediate post-war period, the ruling prices appear even more favourable. For instance, standard butter-boxes commanded as high as 2s. 7½d. at that time, compared with only about 2s. for the same type of box last season.

Equal interest attaches to the fact that, in spite of the reduction of hours, no shortage of sawn timber can be attributed thereto, the happy position having developed where demand is substantially in balance with the productive capacity of the industry under the reduced working-hours. It is not improbable that this will prove to be in the long-term interests of the industry. Any material increase in demand above the present level would probably necessitate the bringing of additional units into production, and at an increased level of consumption it is extremely doubtful if the demand could continue for any long period, so that the industry, much sooner than otherwise, would have been faced with a reduced operating ratio.

There is also little doubt that the combined effect of exercising control over prices at the same time that production costs have been increasing has proved one of the strongest incentives which the industry has ever experienced in improving the efficiency of every phase of its activities. As referred to in detail in the following paragraphs of this report, substantial progress is being reflected as a result of these developments not merely in the logging and sawmilling sections of the trade, but in the seasoning and merchandising sections.

2. LOGGING AND HAULING.

Logging by tractor with and without accessory arch equipment continues to command increasing attention throughout the Dominion. As usual in the development of all new logging methods, the limitations of this equipment were not apparent at the outset, and it is clear from experience by various operators that only in exceptional cases can it be regarded as a complete solution of the logging problem, its general function being supplementary to both ground skidding and (or) overhead logging. Its limitations on soft country are to be noted in particular and, although not as widely destructive of advance forest growth as overhead logging, tractor operation will necessitate considerable supervision to minimize such damage.

The effect of the forty-hour week appears to be of much more serious consequence in logging than in any other phase of the industry, largely because lost time in this section of the work tends to have a far-reaching effect upon the operating efficiency of the sawmill, an adequate reserve of logs on mill-skids against possible interruptions in log-supplies being fundamental to a high operating ratio in the sawmill. In large units, of course, it is possible to meet the situation by employing an extra gang, but in small operations this course is impracticable, and it has therefore been necessary for such units to face a reduced output of sawn timber, with corresponding increases in overhead charges.

The economies made possible in haulage-costs by the use of Diesel power units and of trailers, more especially over long distances, has tended to extend the life of many operations, allowing them to draw upon more distant sources of supply of logs of both indigenous and exotic timbers. This development has also directed attention to the possibilities of road transport in various districts where railways are limited either by lack of traffic or other considerations. As judged by the latest developments in other countries, the full possibilities of road transport in New Zealand cannot be realized under the existing limitations imposed by the various road and transport enactments and regulations. The existing limitations of loads appear to be premised on out-of-date considerations. Modern engineering principles and practices would now indicate that the existing limitations can be raised considerably to allow the use of vehicles which will not only carry much larger payloads, but at the same time will cause considerably less damage to the roads than the class of vehicle which is now in general use. It is hoped that the representations made by this Service along with other interested authorities will have the desired effect of permitting the fullest development of road transport, the indications being that its ton-mile costs may be reduced below railway ton-mile costs.

3. SAWMILLING.

Developments in sawmilling technique and methods during the period under review call for little comment. Generally speaking, the most promising development is a tendency to improve the standard of mechanical engineering throughout the industry. There is an increased appreciation of the necessity for rigid foundations and improved twin-circular headrigs and carriages. With the increasing production of timber on the West Coast of the South Island it is hoped that the introduction of log frames and the wider use of deal frames will prove feasible. The inherent sawing accuracy of such equipment has much to commend it not only to the industry in the saving of sawdust and planing mill waste, but to the consumer in increased serviceability. It would also appear that wider use of mechanical trimming saws would prove advantageous in some mills where lack of this equipment and reliance upon hand trimming prevents operators from realizing to best advantage upon the product of their logs. In a few mills extra breast bench equipment has been installed to maintain production under forty-hour-week operation, but this, of course, has been feasible only where log-supplies could likewise be stepped up by the employment of extra gangs.

4. DRYING OF TIMBER.

While little, if any, improvement in air-drying practices is evident throughout the industry, marked progress continues to be achieved with kiln-drying. Not only were a number of completely new installations made during the year, but in several cases existing equipment was duplicated. The two joinery factories erected by the Housing Construction Department have likewise been equipped with dry kilns; and the total dry-kiln equipment now available to wood-users is having a material effect in improving the standard of building construction throughout the Dominion.

Prejudice against kiln-dried timber continues to be experienced, and may tend in some localities to increase through the use of poorly kiln-dried timber. Consumers are therefore urged to take advantage of the advisory service which is made available by the State Forest Service for the guidance of all interested in the proper drying of timber. Reference was made in the previous annual report to various weaknesses in kiln-drying practices, and while every effort is being made to correct these much room for improvement still remains. The special attention of consumers is directed to the fact that disastrous results may follow the drying of mixed qualities, thicknesses, and species of timber, and to guard themselves against such possibilities they are recommended to insist upon the separate drying of different qualities, thicknesses, and species. The attention of kiln-operators is likewise directed to the necessity for exercising greater care in the preparation and placement of kiln samples, as reviewed in the previous annual report. It is also pertinent to state that the kiln-drying of 3 in. and 4 in. stock should be recognized as involving drying periods which make the operation comparatively costly, particularly if the kilns are required for the drying of thinner stock. It would appear in most cases to be more economical if sufficient quantities of such stock could be assembled and air-dried down to about 30 per cent. moisture content before kiln-drying.

In conclusion, wood-users may be assured that properly controlled kiln-drying is immeasurably superior to air-drying. The basic consideration is that with the increasing tendency to improve the insulation of houses and to centrally heat all classes of buildings, the timber required for such structures cannot be used without further shrinkage even if air-dried for ten years or more, but must be kiln-dried to secure that shrinkage prior to use. On the other hand, it must be emphasized that poor kiln-drying can damage timber much more seriously than air-drying, and potential operators of kilns are warned against the erection of equipment unless it is of approved construction and design and unless they are prepared to place in charge thereof a kiln-operator of more than average intelligence. A general warning is issued against the use of so-called insulation boards for the lining of dry kilns, especially of roofs.

5. GRADING.

Arising out of the numerous price investigations and the operation of the Butter-box Pool it became apparent early in the year that an early revision of practically all grading rules was imperative. Studies were therefore initiated into the modification of the National Grading Rules for Building Timbers formulated in 1928. The underlying purpose of this investigation was to correct the inherent limitations of the so-called "medium" quality which was introduced into the grading of rimu and miro for the first time in 1928 and to redefine the definition of "heartwood" to bring it into conformity with standard timber nomenclature in other countries.

A far-reaching study was also undertaken with a view to standardizing the sizes of the various types of butter-boxes so that these could be manufactured from the same-sized timbers. A complementary investigation covered the grading of white-pine on a percentage yield basis so that the natural product of the log could be used to the best advantage in the manufacture of the various types of containers. Although not completely finalized, the results of these studies will be used in the operation of the Butter-box Pool for the forthcoming year, enabling marked economies to be effected thereby.

In co-operation with the New South Wales Forestry Commission, a comprehensive study was undertaken into the grading of poles, cross-arms, sleepers, and general constructional timbers for use in New Zealand. Officers of the Commission visited New Zealand for the purpose of conferring with officers of this Service and of all the important wood-using departments, and as a result of their investigations it has been possible to eliminate much of the trouble which has hitherto occurred in the export of New South Wales hardwoods to New Zealand.

While the State Forest Service is responsible for the field studies in connection with grading investigations, final decisions thereon are made by a Special Timber Committee set up by the Government for this and other purposes in 1927. With the establishment of the New Zealand Standards Institute this Committee, in all matters pertaining to grading, acts as a sub-committee of the Building Divisional Council of the Institute, and to it there are being reported the whole of the investigations outlined above. In the case of the Australian hardwood investigations a sub-committee, consisting of officers of the New Zealand Railways, the Public Works and Post and Telegraph Departments, and the State Forest Service, was set up to produce standard specifications for all classes of imported hardwoods, and this work has now advanced sufficiently to warrant an announcement that these specifications will receive early consideration by the Special Timber Committee for recommendation to the New Zealand Standards Institute as tentative standards. Similar action by the Timber Sub-committee in respect to both the National Grading Rules for Building Timbers and to white-pine grading rules is also anticipated during the forthcoming year.

6. WOOD PRESERVATION.

Continued observation of the creosoted fence-post and telegraph-pole lines erected throughout the Dominion, some of which are still serviceable after fifteen years' use, augur well for the plans which have now been entered upon for the production on a commercial scale of creosoted posts and poles, &c. Open tank plants are being erected at the outset for the treatment of larch and eucalypt timbers, but these will be followed next year by the installation of pressure plants to deal on a still larger scale with the large quantities of pine timbers now becoming available as a result of thinning operations.

Further investigations have also been initiated into the control and prevention of sapstain on exotic timbers. Numerous chemicals for the control of stains and moulds are being developed, and as the results of trials by other authorities are received the most promising materials are submitted to tests representative of commercial conditions in the Dominion. Already it would appear that no difficulty will be faced in eliminating sapstains and moulds in the new sawmilling units now being planned by the Department.

Sporadic outbursts of alarm over the reported destruction of wooden buildings by borer attack have resulted in the initiation of a Dominion-wide survey by the Forest Entomologist as a priority project. Undue alarm has been caused by ill-advised propaganda. Undoubtedly a few structures have been seriously affected, but very many more, on the other hand, are entirely free from any attack, and the national survey now in course of progress is for the purpose of determining the incidence of attack by the more destructive insects. Where timbers are already infested owners are recommended to secure the services of a professional architect for the purpose of supervising treatment by specialists. In this connection it cannot be over emphasized that the basic essentials in such treatments are to remove infested timber wherever practicable, or otherwise to ensure that a sufficient quantity of a good wood preservative is forced into the interior of the timber. Incidentally, slight dampish conditions would appear to favour the activities of these insects, indicating that correction of these, either by improving ventilation or by correcting faulty plumbing, should be attended to.

As regards new structures, both sawmillers and timber-merchants are fully alive to the necessity for avoiding serious repercussions upon the timber trade by the sale of infested timber, and are making active efforts to improve yard sanitation. Similarly, in the design of new structures, architects and builders may improve the resistance of buildings to borer attack by providing adequate ventilation to all timbers and by improving plumbing practices. With these precautions, wood-users may reasonably expect a serviceable life from buildings long in excess of any period for which they will remain as modern, usable structures. The question also arises whether or not, in the interests of public health, it should be compulsory for the sites of all dwellings to be covered with a mat of some material impervious to moisture.

7. MISCELLANEOUS.

Miscellaneous investigations undertaken during the year include the use of various timbers for pencil, clothes-peg, last, and butter-box manufacture. Following the successful shipment to Great Britain of several small parcels of butter packed in rimu boxes, arrangements were made with the Marketing Department to purchase 125 tons of butter packed in rimu boxes for further trial shipments to Great Britain. Similar trial shipments on a small scale have also been arranged in Australia, and it is anticipated that some definite indication as to the commercial practicability of this development will be available during the forthcoming year.

CHAPTER IV.—THE TIMBER TRADE.

1. GENERAL.

A production of 320,000,000 ft. board measure of sawn timber has been estimated for the year ending 31st March, 1937, and the same cut is predicted for the forthcoming year. These figures represent an increase of 27,000,000 ft. board measure over the cut of 293,000,000 ft. board measure reported by the Government Statistician for the year ending 31st March, 1936, and for which the State Forest Service prediction was 300,000,000 ft. board measure. The prediction of an annual cut of 320,000,000 ft. board measure for the forthcoming year is premised on a revival of public confidence in private building, without which production would tend to fall materially.

As anticipated in the previous annual report, the reported production for the year ended 31st March, 1936, registered an increased cut for all building timbers, but it is significant that the reported cut of white-pine for that period was actually lower than for the previous year. Not unexpectedly the reported cut of insignis pine attained a new record of 34,000,000 ft. board measure in this period, and it is not unlikely that a further increase to 40,000,000 ft. board measure may prove to have been attained during the year ending 31st March, 1937.

2. DOMESTIC MARKETS.

The question of prices has already been reviewed in a preceding chapter of this report.

Rising prices, admittedly, tend to contract demand, but in the initial stages of any period of economic recovery such as that now being experienced throughout the Dominion the effect is usually negligible. That some contraction in demand, however, has occurred during the latter part of the year is undeniable. At the commencement of the year merchants, for the first time since the depths of the depression, felt sufficient confidence in the building situation to warrant them in stocking up their yards almost to capacity, but a hiatus occurred until the recent announcement by the Government of the proposed rents for its new houses. The result of this announcement has been to revive public confidence in private building, and a more optimistic tone amongst builders and merchants augurs well for continued production at present levels.

The limitation of the subsidy by the Unemployment Board to £700 structures made in January 1936, and the subsequent withdrawal of all subsidies at the end of September, 1936, served to explain, along with the other factors reviewed, the small increase in dwelling permits from 3,181 for the year ending 31st March, 1936, to only 3,282 for the period under review. The total value of permits for all classes of buildings increased, however, from £5,929,803 to £6,581,233, representing the highest total recorded since the year 31st March, 1930.

The imported building softwoods, consisting almost wholly of Douglas fir and redwood, have shared in the increased demand for timber, but the trade is of negligible proportions, amounting to less than 7,000,000 ft. board measure and equal to less than 3 per cent. of the local production of building timbers. Doubtless importations would have been slightly larger had it not been for a shortage of vessels resulting from the shipping strike on the Pacific Coast of North America, another effect of which has been to accentuate marked increases in f.o.b. prices for these timbers.

The increased demand for Australian hardwoods so prominent in 1935 failed to develop further during 1936, importations falling from 23,500,000 ft. to less than 20,000,000 ft. board measure, but an early recovery is anticipated as a result of Government constructional activities in connection with railways and public works.

3. EXPORTS.

A totally unexpected decline in exports from 39,642,000 ft. board measure in 1935 to only 27,027,000 ft. in 1936 has converted, as far as the external timber trade is concerned, a favourable balance into an unfavourable one. Kauri was the only important timber of which the exports increased over those for the previous year, emphasizing the necessity for immediate export control of this timber. The decline in white-pine exports from almost 23,000,000 ft. to less than 15,000,000 ft. board measure has been explained elsewhere in this report. No less surprising was the decline in exports of rimu from 9,000,000 ft. to 6,000,000 ft. board measure, this being accounted for by the excellent local demand, coupled with the fact that the local prices have given a better return than the export prices. The same comment is probably applicable to the reduced exports of matai. In the case of silver beech, only 2,033,000 ft. board measure were exported during 1936, as compared with 2,766,000 ft. during the previous year, but in this case the decline is due largely to the fact that the markets for this timber in Australia have contracted materially. Hitherto the motor-body building industry has absorbed a large part of the exports to the Commonwealth, but with the swing-over from wood or composite construction to all-steel structures, an acute position has developed on this market. New Zealand silver beech is not the only timber affected, several Australian timbers being used for the same purpose either on the same or a larger scale. With a heavy reduction in demand for all motor-body-building timbers, competition between them in other fields has naturally been intensified, and it is a tribute to the sterling qualities of the New Zealand timber that its exports remain even at the present level.

The reduced exports of insignis-pine box-shooks are believed to be of only a temporary nature and it is fully anticipated that during the forthcoming year the 1935 record will be attained, if not exceeded.

4. REGIONAL PLANNING OF INDIGENOUS FOREST AREAS.

Arising out of the acute shortage of white-pine and of the necessity for reinstatement of export control of various timbers, attention has been focused as never before on the vital importance of maintaining in productivity as many as possible of the remaining major indigenous forest areas. The coastal plain and low terrace rimu forests of South Westland form an area of outstanding importance. Not only do they occupy essentially forest lands unsuitable for agriculture, but they carry the most extensive stand of pole-type forest in the Dominion. Promising as they do to lend themselves to some type of selective cutting, it has been thought desirable to plan the development of these forests on a regional scale with a view to providing transport facilities which will allow them to be managed on a sustained yield basis and according to appropriate silvicultural treatment.

Having regard to the national importance of this project, the Government authorized the setting-up of a South Westland Development Committee representative of officers of the New Zealand Railways, the Departments of Public Works, Marine, Transport, and Agriculture, and the State Forest Service. This Committee has since been actively engaged on a searching investigation of transport facilities both by land and sea, immediate attention being concentrated upon the development of the sector lying between Ross and the Waihou River. The State Forest Service has also initiated various surveys into the white-pine resources of this sector and, as already shown, the preliminary results indicate the necessity for revising downwards all earlier estimates of white-pine. The final recommendations of the Committee will not be available until the mid-part of the forthcoming year.

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, 1934-1936.)

Species.	1934.		1935.		1936.	
	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	96,125,000	48.6	125,488,000	51.4	157,631,000	53.8
White-pine	47,949,000	24.3	52,294,000	21.5	52,075,000	17.8
Matai	10,760,000	5.5	13,880,000	5.7	19,069,000	6.6
Kauri	4,946,000	2.5	5,553,000	2.3	7,332,000	2.5
Totara	7,197,000	3.6	8,867,000	3.6	11,778,000	4.0
Beech	6,972,000	3.6	7,725,000	3.2	8,855,000	3.0
Insignis pine	21,494,000	10.9	27,311,000	11.2	34,104,000	11.6
Miro	671,000	0.3	915,000	0.4	772,000	0.3
Tawa	214,000	0.1	746,000	0.3	25,000	..
Rata	97,000	0.1	92,000	..	126,000	..
Other	1,230,000	0.5	911,000	0.4	1,308,000	0.4
Totals	197,655,000	100.0	243,782,000	100.0	293,075,000	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, 1934-1936.)

Provincial District.	1934.		1935.		1936.	
	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	83,915,000	42·5	100,780,000	41·3	118,538,000	40·4
Hawke's Bay	9,683,000	4·9	11,867,000	4·9	12,781,000	4·4
Taranaki	1,839,000	0·9	2,291,000	0·9	4,330,000	1·5
Wellington	21,312,000	10·8	22,731,000	9·3	22,937,000	7·8
Marlborough	4,041,000	2·0	2,954,000	1·2	2,511,000	0·9
Nelson	6,461,000	3·3	11,198,000	4·6	17,322,000	5·9
Westland	42,316,000	21·4	57,543,000	23·6	73,921,000	25·2
Canterbury	4,391,000	2·2	5,085,000	2·1	6,085,000	2·1
Otago	5,682,000	2·9	5,489,000	2·3	6,476,000	2·2
Southland	18,015,000	9·1	23,844,000	9·8	28,174,000	9·6
Totals	197,655,000	100·0	243,782,000	100·0	293,075,000	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, 1934-1936. Value represents value in country of export, plus 10 per cent. expressed in terms of New Zealand currency.)

Item.	1934.		1935.		1936.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ft. b.m.	£	Ft. b.m.	£	Ft. b.m.	£
Hardwoods—						
Australian hardwoods	10,350,000	142,200	23,416,000	298,000	19,955,000	270,890
Oak	1,655,000	29,760	1,550,000	24,760	2,691,000	40,780
Totals	12,005,000	171,960	24,966,000	322,760	22,646,000	311,670
Softwoods—						
Douglas fir	3,128,000	24,780	3,472,000	25,790	4,170,000	36,560
Butter-boxes	849,000	15,250	756,000	13,160	1,513,000	29,310
Redwood	752,000	8,540	1,255,000	15,980	2,115,000	28,120
Totals	4,729,000	48,570	5,483,000	54,930	7,798,000	93,990
Other	266,000	8,610	907,000	16,710	682,000	16,690
Grand totals	17,000,000	229,140	31,356,000	394,400	31,126,000	422,350
Laths, palings, shingles, &c.	..	2,900	..	4,110	..	5,587
	Tons.		Tons.		Tons.	
Tanning-bark	1,739	18,030	2,173	21,880	1,248	14,810
Wood-pulp	3,641	32,540	4,246	37,150	4,406	47,790

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, 1934-1936.)

Item.	1934.		1935.		1936.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ft. b.m.	£	Ft. b.m.	£	Ft. b.m.	£
White-pine ⁽²⁾	22,791,000	213,290	22,709,000	214,240	14,824,000	140,000
Rimu ⁽³⁾	7,151,000	51,470	9,009,000	69,820	6,095,000	49,800
Beech	2,410,000	25,410	2,766,000	29,350	2,033,000	20,470
Matai ⁽⁴⁾	..	..	2,842,000	22,810	2,142,000	16,620
Kauri ⁽⁵⁾	679,000	18,490	627,000	18,050	934,000	26,380
Insignis pine box-shooks ⁽⁶⁾	712,000	5,620	1,607,000	9,660	899,000	10,760
Other—						
New Zealand	787,000	6,250	25,000	430	29,000	670
Foreign	40,000	290	57,000	830	50,000	1,090
Totals	34,570,000	320,820	39,642,000	365,190	27,026,000	265,790
	Tons.		Tons.		Tons.	
Kauri-gum	3,209	86,920	2,872	79,110	3,237	96,160
Tanning-bark	32	240	..	..	..	..
Fungus	64	3,790	76	5,370	947	5,020

⁽¹⁾ 96 per cent. exported to Australia; 2 per cent. to Western Samoa; remainder to other Pacific Islands and United Kingdom.⁽²⁾ Exported for butter-boxes, shelving, whitewood furniture, &c. ⁽³⁾ For flooring, linings, and joinery.⁽⁴⁾ Prior to 1935, exports of matai were small, and included in "Other—New Zealand." Principally used for floorings and linings.⁽⁵⁾ For floorings, linings, tanks, and vats, &c. ⁽⁶⁾ Principally for Pacific Island fruit-cases.

CHAPTER V.—GENERAL.

1. LEGISLATION.

Legislation affecting State forests enacted during the year is summarized as follows:—

Finance Act, 1936.—Section 24 of the Finance Act, 1936, authorizes the transfer of moneys aggregating £13,957 8s. 5d. from the Forests Account to the Working Railways Account. This sum was expended out of the Working Railways Account in the administration and protection of two forested areas now wholly subjected to the provisions of the Forests Act, 1921-22, and known respectively as the Puketā State Forest, containing 15,395 acres, in North Auckland Land District, and Oruanui State Forest, containing 1,342 acres, in Auckland Land District.

The timber on these areas has not been used for railway purposes, and no longer being required for such purposes it was decided to refund the moneys mentioned above to the Working Railways Account from the proceeds of sales of the timber.

Reserves and other Lands Disposal Act, 1936.—(a) Section 7 cancels the permanent State forest reservation over 416 acres 2 roods 33 perches in Katikati, Aongatete, and Wairere Survey Districts, Auckland Land District, and the land is set apart as a scenic reserve.

(b) Section 24 cancels the provisional State forest reservation over a total of 4,975 acres in Waitahu, Rahu, and Lewis Survey Districts, Nelson Land District, and the land is set apart as a scenic reserve.

(c) Section 26 cancels the provisional State forest reservation over a total of 260 acres and the permanent State forest reservation over a total area of 9,715 acres situated in Gillespies and Waiho Survey Districts, Westland Land District, and the lands are set apart as scenic reserves.

(d) Section 29 cancels the provisional State forest reservation over 1,050 acres in Heringa Survey District, Marlborough Land District, and the land is set apart as a scenic reserve.

State Forest Regulations.—The State Forest Regulations Amendment, 1936, amended the State Forest Regulations made under the State Forest Act, 1908, and provided that no timber shall be sold except at such price or at such rates as the Commissioner of State Forests may determine.

2. FINANCE.

Receipts.

The total receipts from all sources (£133,790) show an increase of approximately £27,000 on the figures for the previous year, an indication that the sawmilling industry continues to share in the general improvement in economic conditions, and is the highest total recorded for eleven years. Details of the receipts under the various headings for the past four years are shown hereunder :—

Item.	1936-37.	1935-36.	1934-35.	1933-34.
Indigenous-forests receipts—	£	£	£	£
Timber-sales	91,980	74,828	47,179	31,017
Timber royalties and trespass	6,257	5,006	5,449	3,164
Leases, grazing	1,692	1,757	1,646	1,816
Sawmill-sites, industrial, &c.	705	957	1,417	1,348
Miscellaneous	4,252	2,844	2,125	2,206
National Endowment Account allocation ..	21,807	15,712	10,990	6,612
Nurseries and plantations—				
Trees and seeds	7,097	5,874	4,094	6,546
Firewood and poles				
Miscellaneous				
Totals	133,790	106,978	72,900	52,709

Payments.

The net expenditure for the year shows an increase of £103,000 on that of the previous year, the greater part of which (£79,000) is accounted for in the afforestation section. This is due to the fact that in the previous year the employment of casual labour on planting, &c., was wholly financed from the Employment Promotion Fund, whereas for the year under review, with the exception of the first two months of the year, payment was made from the State Forest Account and a subsidy of 40 per cent. for single men and 60 per cent. for married men recovered from the Employment Promotion Fund.

The other increases are—Salaries, £10,000, chiefly due to the restoration of cuts; National Endowment Account and local-body payments, £11,000, due to the increase in revenue; and management of indigenous forests, £3,000, due to increased roading and other activities in kauri forests.

Item.	1936-37.	1935-36.	1934-35.	1933-34.
Fixed charges and staff salaries—	£	£	£	£
Interest and expenses of raising loans ..	801	525	172	269
Staff salaries	51,616	41,374	34,155	32,901
Allocation of revenue—				
National Endowment Account	10,934	7,117	3,436	3,893
Local-body payments, &c.	16,739	9,243	5,903	3,508
Management, establishment, and develop- ment—				
Indigenous forests	17,863	14,763	11,735	8,817
Fire-fighting equipment and prevention ..	415	415	805	820
Educational: Reference library, &c. ..	194	260	445	120
Research and experimental equipment, &c.	567	836	528	1,022
Afforestation: Nurseries and plantations ..	139,761	60,642	59,136	54,292
Land-purchase	..	70	..	10,542
Miscellaneous	84	500	343	202
Totals	238,974	135,745	116,658	116,386

3. HONORARY FOREST RANGERS.

A record of achievement in the protection of State forests from damage by fire and vandalism would be incomplete without appreciative reference to the support of the 161 honorary forest rangers holding appointment under the Forests Act, 1921-22. The voluntary assistance of this group is the only protective link of many State forests remotely situated from damage by fire and vandalism, and not the least of many important duties performed is the regulation of burning within "fire districts" during seasons when burning without a written permit of a forest officer is an offence punishable by a fine of £50 or three months' imprisonment.

The guardianship of some State forests would, by reason of their isolation, be quite inadequate were it not for the supervision given by local honorary forest rangers, and to one and all I extend my grateful thanks.

APPENDIX I.

SUMMARIZED REPORTS ON STATE AFFORESTATION.

AUCKLAND REGION.

Again this region experienced a year with fairly regular and well-distributed rainfall, although the total falls recorded were much below the previous year's figures.

The weather conditions naturally reduced the fire hazard which is usually associated with the kauri forests of the North and the exotic forests during the summer months, and were excellent for tree-growth on light, well-drained soils, but the trees growing on heavy clay formations did not do so well.

Tree-planting was again restricted to minor areas at Waipoua and Tairua and to blanking and consolidation of previously planted areas. Trees distributed from the various nurseries numbered 440,000, while the seedlings raised for future planting total approximately 600,000.

Waipoua Plantation.—In compartment 6 an aggregate area of 294 acres was planted—*P. palustris* 122 acres and *P. pinaster* 172 acres—and a good strike was obtained. In the nursery the following sowings were made and seedlings raised: Kauri, 11 lb., 8,000 trees; *P. palustris*, 42 lb., 39,000 trees; *P. taeda*, 31 lb., 60,550 trees; *P. echinata*, 1 lb., 6,700 trees.

The usual maintenance-work, roading, fencing, telephone-lines, establishment of firebreaks, &c., was carried out.

Riverhead Plantation.—At this station 4,800 poplar cuttings were planted in certain swamp areas and 10,000 *P. radiata* trees were used for blanking. As an experiment 42 lb. of *P. canariensis* were spot sown, but the ultimate results were indifferent. Firebreak clearing covered 202 acres, ploughing 79 acres, discing 132 acres, while 202 chains of gorse were grubbed. Other maintenance included 27 miles of road-grading, clearing scrub from roadsides, &c. In the nursery 70,000 seedlings (*P. radiata*) were raised from a sowing of 8 lb. of locally collected seed, and 15,000 poplar cuttings were put out for rooting. Trees from the previous year's planting were lined out.

Pukipuku Plantation.—At this station *P. radiata* is developing fairly satisfactorily on suitable sites, as are some species of eucalypts, but most of the mixed stands would be improved by thinning.

A topographical survey and reconnaissance of this area is now in hand, and when the contour work is completed a species survey will be undertaken.

Maramarua Plantation.—Rapid growth generally is being made by the trees at this station, and the plantation has now reached the stage where pruning, thinning, and cleaning would be an advantage; plans to this end are in hand.

Maintenance-work included clearing, draining, stumping, discing, and ploughing firebreaks as required, metalling roads, repairs to telephone-lines, painting of buildings, &c.

The main sowing in the nursery was 34 lb. of *P. taeda*, but the seed was not up to the usual standard of quality and only 60,000 seedlings resulted.

Tairua Plantation.—New planting here comprised 33 acres of *P. pinaster*, whilst the usual maintenance-work of clearing, burning, ploughing, &c., of firebreaks, erection of and repairs to telephone-lines and fences, reconditioning roads, &c., was kept well up to date.

Most species continue to make good progress, but the most promising is *P. caribaea*, although *P. ponderosa* and *P. palustris* are also showing up well.

Very little seed was sown in the nursery, the principal species being *P. radiata* 4 lb., germination 50,000; *P. pinaster* 4½ lb., germination 25,000; and *C. lawsoniana* 1 lb., germination 28,000. Poplar cuttings to the number of 1,000 were lined out.

ROTORUA REGION.

Kaingaroa Plantation.—The areas planted totalled 5,568 acres with 3,704,400 trees; an average of about 666 per acre. The species used were *P. ponderosa* 60 per cent., *Ps. taxifolia* 38 per cent., *P. Murrayana* 2 per cent.

Blanking operations were commenced during the year, and 3,025 acres were blanked up mainly with *P. ponderosa*, *P. Murrayana*, and *P. radiata* in that order.

Twenty-eight miles of new roads were formed within the plantation, thirteen miles of fencing were completed, thirty miles of new telephone-lines were erected, and 5 chain firebreaks were laid off along the boundaries of the newly planted areas on Runs 90 and 91.

Thinning and underscrubbing were carried out over an area of approximately 7,600 acres, and 4,710 trees were cleaned to a height of 18 ft.

In the nursery at Wairapukao from a sowing of 581 lb. of seed 3,240,000 trees were obtained, while at Rotorua nursery 40 lb. of seed produced 858,900 seedlings. From the first-mentioned nursery 5,166,000 trees were lifted and from the latter 1,819,600, making a total of 6,985,600. Estimated tree stocks in both nurseries total 8,609,600.

The stocktaking at Waiotapu (mentioned in last year's report) was completed and a compartment survey was immediately taken in hand to secure the necessary data to enable an accurate computation of the volumes of the various species to be made. The field-work is completed, but much plan-work still remains to be done.

The topographical survey of Whakarewarewa Plantation commenced in February, 1935, was completed in May, 1936.

Underscrubbing and thinning were undertaken at both these plantations, over 2,000 acres being treated in this way.

Plantation thinnings of a royalty value of £1,318 9s. extracted by private contract from Whakarewarewa Plantation during the year comprised 12,349 posts, 39 poles, 137 cords of firewood, and 110,348 mine props; from Waiotapu Plantation 22 cords of firewood were obtained, and in addition 369,875 cubic feet of produce was extracted for departmental use. Details are 480 poles, 232 strainers, 1,782 props, 2,463 cords firewood, and 16,403 posts.

WELLINGTON REGION.

Most species in Karioi Plantation are making good growth, particularly *P. murrayana*, *P. ponderosa*, and *P. laricio*; *Pseudotsuga taxifolia*, after four or five years of apparent stagnation, is also beginning to make headway.

The fire hazard was not so acute as in some years past, and the few fires started by sparks from railway locomotives were put out before the firebreaks were crossed. One fire-patrolman was employed during the danger season, and for further protection fire-boxes to house fire-fighting tools and telephones were built at intervals along the railway frontage.

Maintenance-work, such as repairs to roads, bridges, &c., and renovating and repainting cookhouse, motor-shed, and four whares was attended to. A new cottage for a workman was built in compartment 7 near Karioi Railway-station.

Destructive animals destroyed included 504 hares and rabbits, twelve head of deer, and one of wild cattle.

From the nursery 64,500 trees were lifted and used in the plantation, 700 poplar cuttings of seven varieties were set out, and 118,400 trees were lined out. Seed sown was, in protected seed-beds, 69 lb., line-sown 46 lb. The number of seedlings obtained was 335,000. Owing to the ravages of birds, the line-sowing was a complete failure, despite the use of poisoned wheat. At the close of the year tree stocks in the nursery were estimated to total 523,800, the main species being *P. laricio*, *P. murrayana*, and *P. ponderosa*.

At Erua a further area of 224 acres was planted; the main species used was *Thuja plicata*, with a small number of *Tsuga heterophylla*.

Swamps in the tussock country were drained by digging 46 chains of drains and 220 chains of new road formation were completed.

NELSON REGION.

At Golden Downs a new area of 47 acres was planted, which brings the net planted area to 19,292 acres. In compartment 13, 73½ acres of *P. radiata* trees established in 1927 were pruned to a height of 7½ ft. These trees average 30 ft. in height and 8 in. d.b.h. Two types of pruning saw were used. Species surveys covering 7,234 acres were carried out.

Cleaning was necessary to free trees from blackberry, bracken, &c., and 1,739 acres of plantation were silviculturally treated in this way; the total area cleaned to date is 3,900 acres. The most dangerous sections of the external firebreaks were reconditioned as a fire-protection measure, the distance being 6,700 chains.

In the three nurseries 1,484,000 trees were lifted, 897,000 being utilized for planting and the remainder (587,000) being lined out; 410 lb. of seeds were sown, yielding approximately 2,185,000 seedlings. At the close of the year the trees two years and over in the nurseries were estimated to total 1,812,000.

The rainfall was 63.4 in., the greatest for seven years, and, being fairly well distributed over the year, was beneficial to tree-growth, with the exception of two abnormally heavy falls in August and February (4 in. and 7 in. respectively) which caused serious flooding and some damage to roads, bridges, and planted areas.

WESTLAND REGION.

In common with other districts the wet fire season on the West Coast reduced the fire danger very considerably and no damage was done, but nevertheless a strict patrol of the plantation was necessary as certain danger periods did occur. The principal year's work was tree cleaning, and 876 acres of *Thuja plicata*, 1931 planting, were cleaned by removing the overhead branches as much as possible. This treatment will assist materially in increasing tree-growth. General maintenance-work consisted of repairs to fences and telephone-lines, renovations to buildings in the nursery, cleaning out drains, &c.

CANTERBURY REGION.

Small areas were planted at Hanmer, Balmoral, and Eyrewell, mainly firebreaks not required, and at Hanmer a block to round out the northern boundary. Approximately 300,000 trees were used. Excellent tree-growth due to the unusually wet summer is reported from all plantations.

Tree-pruning was carried out at all three plantations. At Hanmer pruning on an area of 126 acres was done to a height of from 16 ft. to 20 ft. to obtain good-quality timber, final crop trees being selected. Pole saws were used in this operation. At Balmoral and Eyrewell the work was confined to an average height of 6 ft., and 650 acres and 610 acres respectively were dealt with. Sample plots were established to ascertain the effect of green pruning upon young trees. At Hanmer approximately 310 acres were thinned, and the produce removed comprised 1,798 cords firewood, 1,082 posts, 20 poles, and 2,114 rails. From similar work over an area of 29 acres at Balmoral 361 cords of firewood were obtained.

SOUTHLAND REGION.

Thinning was continued at Dusky Plantation and a quantity of 94,632 cubic feet was obtained. Underscrubbing and thinning were also undertaken at Conical Hills (293 acres), Parkhill Block (Dusky), (304 acres), and Naseby (448 acres).

In addition to the quantity of 93,053 cubic feet sold to Waitane Sawmilling Co., Ltd., other sales of forest produce were 103 cords firewood, 2,000 poles, 6,700 netting stakes, 4,244 posts, and 83 radio masts.

Green pruning was extensively practised at Blue Mountains Plantation, and 538 acres of ten-year-old *P. radiata* were treated. An appreciative reduction in the cost of this work as compared with the previous year was reported, due to improved technique, despite the shorter hours worked and higher wages paid.

The usual maintenance-work in the plantations was kept well up to date.

APPENDIX II.

LIST OF COMMON AND BOTANICAL NAMES OF SPECIES MENTIONED IN THIS REPORT.

1. INDIGENOUS.

(a) *Softwoods* :—

- Kauri (*Agathis australis*).
- Matai (*Podocarpus spicatus*).
- Miro (*Podocarpus ferrugineus*).
- Rimu (*Dacrydium cupressinum*).
- Totara (*Podocarpus totara*).
- White-pine (*Podocarpus dacrydioides*).

(b) *Hardwoods* :—

- Beech (*Nothofagus* spp.).
- Rata (*Metrosideros* spp.).
- Tawa (*Beilschmiedia tawa*).

2. EXOTIC.

(a) *Softwoods* :—

- Canary Island pine (*Pinus canariensis*).
- Corsican pine (*Pinus laricio*).
- Douglas fir (*Pseudotsuga taxifolia*).
- Hemlock (*Tsuga heterophylla*).
- Insignis pine (*Pinus radiata*).
- Larch (European), (*Larix decidua*).
- Lawson's cypress (*Cupressus lawsoniana*).
- Loblolly pine (*Pinus taeda*).
- Lodgepole pine (*Pinus Murrayana*).
- Longleaf pine (*Pinus Palustris*).
- Maritime pine (*Pinus pinaster*).
- Redwood (Californian), (*Sequoia sempervirens*).
- Shortleaf pine (*Pinus echinata*).
- Slash pine (*Pinus caribaea*).
- Western yellow pine (*Pinus ponderosa*).
- Western red cedar (*Thuja plicata*).

(b) *Hardwoods* :—

- Australian hardwoods, principally *Eucalyptus* spp.
- Oak (*Quercus* spp.).

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