

1925.
NEW ZEALAND.

STATE FOREST SERVICE.

FIRST QUINQUENNIAL REVIEW OF THE OPERATION OF THE NATIONAL FOREST POLICY, TOGETHER
WITH THE ANNUAL REPORT OF THE DIRECTOR OF FORESTRY FOR THE YEAR ENDED 31st
MARCH, 1925.

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

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

SIR,—

Wellington, 1st June, 1925.

I have the honour to submit herewith the first quinquennial review of the operation of the national forest policy, and the report on the activities of the Forest Service for the year ended 31st March, 1925.

I have, &c.,
L. MACINTOSH ELLIS,
Director of Forestry.

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SECTION 1.—FIRST QUINQUENNIAL REVIEW OF THE OPERATION OF
THE NATIONAL FOREST POLICY.

PROGRESS OF FORESTRY DURING THE PERIOD 1920 TO 1925.

I. FOREST POLICY.

- (1.) A Forest Act defining approved principles of operation and policy was made law during the parliamentary session of 1921-22.
- (2.) A managing agent—the State Forest Service—was created in 1920 for the purpose of administering the National Forest Domain on sound, practical, and businesslike lines. This organization now comprises a small body of twelve executive and eighty-three operating officers—equivalent to one operating officer to approximately 90,000 acres.

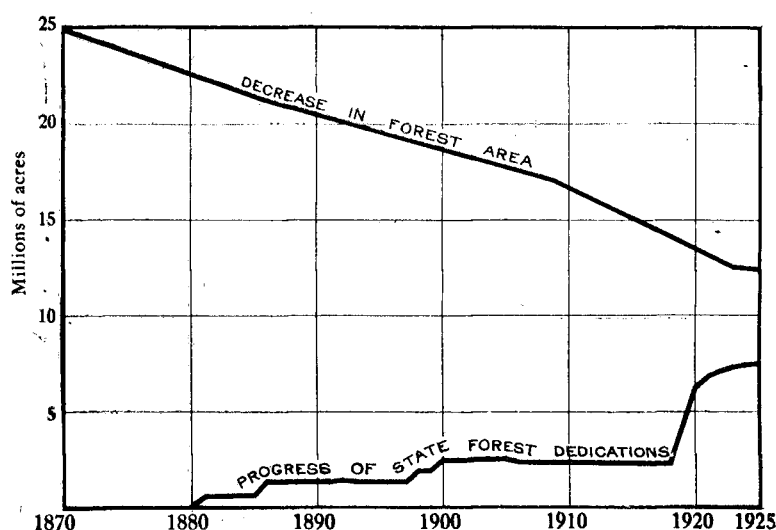
(3.) The policy of dedicating for forest-management all Crown forests and other forest lands chiefly valuable for timber cropping and conservation and not for agricultural or pastoral uses has been maintained by the Government during the period with the results shown in the following schedule:—

AREAS DEDICATED TO FORESTRY AND CONSERVATION DURING THE PERIOD 1920 TO 1925.

Period.	Permanent State Forests.	Provisional State Forests.	Forest Reserves and Miscellaneous.	Total Area.
	Acre.	Acre.	Acre.	Acre.
Dedicated prior to year 1919	1,662,007	..	*	1,662,007
Dedicated during the period 1919-25 (net increase)	96,506	5,630,668	96,409	5,823,583
Total, 31st March, 1925	1,758,513	5,630,668	96,409	7,485,590

* 418,370 acres reserved prior to 1919: of this only 96,409 acres are as yet controlled by the Forest Service.

(Acquisition by purchase of forested lands through the medium of the State Forests Account during the period 1920-25 aggregated over 101,000 acres.)



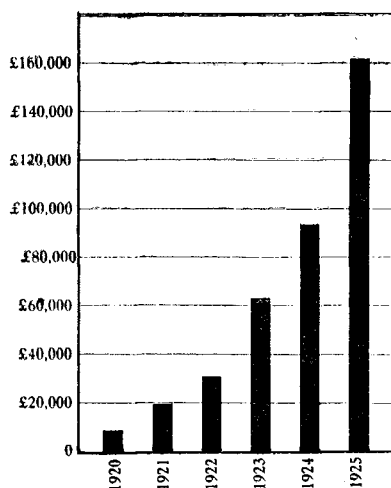
GRAPH SHOWING TOTAL AREA OF FOREST LAND IN DOMINION AND PROGRESS IN DEDICATION OF FORESTS TO CONSERVATION OF TIMBER-CROP PRODUCTION.

(4.) State forestation activities under the approved policy have been speeded up during the period, with the result that 25,500 acres of State plantations were formed, as compared with practically the same acreage during the ten previous years. [The total area of State plantations is now 62,945 acres.]

(5.) The Forest Service fiscal policy as adopted had for its objective the securing of full value and return for every pound expended and for every stick of timber sold. The results speak for themselves.

Year.	Forest Income.	Forest Expenditure.		Source of Expended Moneys.	
	Timber-sales, Tree-sales, Grazing, Miscellaneous Revenue.	Protection, Management, Surveys, Administration, &c.	Forest-land Purchases, Extension of State Plantations, &c.	Debentures.	Service Income.
	£	£	£	Per Cent.	Per Cent.
1919-20	8,514	5,975	60,844	87·3	12·7
1920-21	19,518	14,570	64,981	75·5	24·5
1921-22	30,784	38,087	69,495	71·4	28·6
1922-23	63,372	38,337	47,073	25·8	74·2
1923-24	93,479	42,897	55,406	4·9	95·1
1924-25	161,468	43,091	171,205*	24·6	75·4

* Includes £100,000 for purchase of "Selwyn Settlement" forest.



STATE FOREST RECEIPTS, 1920-25.

A summary of the total receipts and payments of the State Forests Account from the 1st April, 1917, to the 31st March, 1925, including loans raised, interest, and transfers to sinking fund and National Endowment Account, appears in Annexure VII.

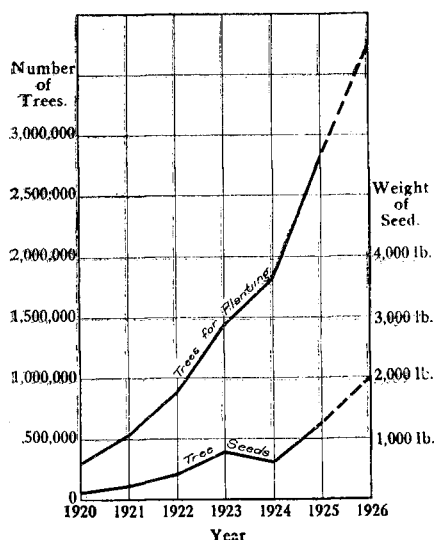
The business of building up a national forest capital and the policy of New Zealand Forests for the New-Zealanders is no more a burden on the Treasury, for within the business itself finances are now securable for these vital purposes, and enough to spare, not only to assist in the building-up of backblock roads and communications in forested counties, and in swelling the National Endowment Fund, but also to provide ultimately surpluses and profits for the reduction of the national debt and the lessening of general taxation.

NOTE.—An allocation of from 10 to 20 per cent. of all net forest revenues secured from the sale of ripe timber from the State forests of the Dominion is now made to all counties within whose boundaries are situated these national forests. These subventions from the Central Government will be many thousands of pounds per year.

(6.) *Education in Forestry.*—The policy of popularizing forestry, a love of trees and of nature, and of developing a wide appreciative knowledge of the benefits to be secured from tree-culture was steadily pursued during the period. By popular lectures; exhibits at agricultural shows; by moving-picture film; by demonstration; by free advice; by producing and selling trees for planting at lowest prices; by the publication and Dominion-wide circulation of descriptive literature (320,000 pieces have been broadcasted in the period); by advertisement; by the "Forestry in the Schools" Campaign; and by many other means the lesson of forestry has been driven home. To-day a splendid and lively "forest consciousness" is evident in the people of the Dominion, both collectively and individually. The country is solid for forestry and the idea of "PLANT TREES AND GROW MONEY."

STATE FOREST SERVICE SALES OF TREES AND TREE-SEEDS FOR PLANTING DURING THE PERIOD.

Year.	Quantity.		Year.	Quantity.	
	Trees.	Seeds. (Weight in Pounds.)		Trees.	Seeds. (Weight in Pounds.)
1919-20	277,235	130	1923-24	1,839,512	618
1920-21	520,702	240	1924-25	2,831,932	1,220
1921-22	897,552	436			
1922-23	1,475,581	746	1925-26 (estimated) ..	3,750,000	2,000



STATE FOREST SERVICE SALES OF TREES AND SEEDS, PERIOD 1920-26.

State schools to the number of 765 have begun school tree nurseries and plantations. Local bodies—such as cities, boroughs, counties, Harbour Boards, Electric-power Boards, &c.—to the number of nineteen, are now carrying on forest-planting projects to the extent of 92,075 acres; proprietary companies, to the number of eighteen, are committed to the formation of 91,900 acres; whilst thousands of farmer settlers are planting millions of trees per annum.

University educational facilities by way of a School of Forestry as recommended have been provided at Canterbury University College for the training of professional forest engineers and technicians, and for the giving of special and applied instruction to timber-land owners, operators, and workers, whilst similar equal facilities have also been made available at Auckland University College. There should be no lack of trained personnel in the near future for the forest industry and for all forestry interests.

(7.) *General.*—The conservation and control of wild life within State forests has received serious attention during the period, for a very close and intimate relationship exists between the indigenous avifauna and the regeneration of the taxad or native “pine” forests. Investigation indicates that “No native bird-life means no taxad forests, and no forests means no native bird-life.” For that reason the State Forest Service has co-operated closely with the controlling Government authority (Department of Internal Affairs) and the Native Bird Protection Society, and others, with a view to building up a better bird sentiment, and, where possible and desirable, prosecutions for illegal shooting have been carried through. It is gratifying to report that the native-bird population of the Dominion is rapidly growing.

The deer herds throughout the Dominion, which, unfortunately for the welfare of the forest-growth, harbour in the forests, had so rapidly increased during the past generation that further investigation was made into this menace during the period. It was found that there were approximately three hundred thousand head in the Dominion, that the annual increase is probably over 25 per cent., and that the yearly damage is in the neighbourhood of £180,000, whilst the problematical annual benefit through licenses and tourists was only £7,000. As a result of representations to the responsible agency open seasons were declared over 11,250 square miles in the South Island, and bounty-moneys were made available for all deer destroyed. To date at least twenty thousand deer have been exterminated in the Dominion by systematic culling, payment of bounty, and open seasons.

The wild-pig nuisance in the Taranaki District has also received attention during the period, and through the control of the Forest Service bounty has been paid on pigs destroyed to the number of 14,533.

The opossum-trapping industry, as far as State forests are concerned, is being carefully regulated in order to avoid overtrapping and extermination of this highly valuable yet forest-harmless animal. For the period approximately 165,550 opossum-skins, with a value of £54,500, have been trapped from State forests.

(9.) During the period the Forest Service, as the one governmental forestry authority, has endeavoured to build up full co-operative relations with other Departments which may have direct or general forest and timber problems. As overlapping and duplication of effort is both wasteful and unnecessary, the knowledge and experience of the Service has accordingly been gladly made available to the Departments of Lands, Mines, Valuation, Public Works, Railways, Native Affairs, Post Office, Education, Prisons, Public Trust, and Industries and Commerce. Over 78,800 acres of valuable timber lands have been examined and reported upon for other Departments, Education Boards, and others.

For local bodies, forest-planting and other similar projects have been investigated and reported upon, whilst for prospective industrial and private planters several thousand reports and advisory memoranda have been prepared. The services of the Department also have been readily given to the public with regard to all timber technological problems and to a thousand and one other aspects of woods and forestry.

II. FOREST-MANAGEMENT.

(10.) A modern and efficient sale policy for the disposal of the ripe and mature timber in State forests was put into operation early in the period, and, as was predicted, with splendid consequential results, both to the State and to the wood using and consuming public, for New Zealand is now securing a fairer and larger share of the competitive market value of all merchantable forests sold for exploitation. The receipts from timber-sales for the period are as follows :—

SCHEDULE SHOWING RIPE TIMBER SOLD AND CONTRACT SALE PRICE OF SAME.

Year.	Timber sold.	Contract Price obtained.	Year.	Timber sold.	Contract Price obtained.
	Sup. Ft.	£		Sup. Ft.	£
1920-21 ..	6,987,000	17,055	1923-24 ..	212,085,000	266,388*
1921-22 ..	35,669,000	38,208	1924-25 ..	69,253,000	96,158
1922-23 ..	78,830,000	95,357			

* Includes three extraordinary departmental sales amounting to £140,000.

(11.) *Forest Statistics.*—The first national forest inventory and stocktaking, which took over three years to compile, was completed by the Service during the period. This examination now makes available for the first time in the forestry history of New Zealand an accurate survey of the Dominion's resources in forest wealth, and provides the means for accurately building future plans of management.

The report exposes in detail the quantity and distribution of all areas of standing timber and woodlands in the Dominion.

(12.) General forest reconnaissance of the State forests has, during the collection of data for the national forest inventory, or during timber inspections, investigation of watershed-protection forests, &c., since 1920, been carried out over practically the whole of the State forests.

(13.) Land classification and demarcation of the State forest domain—so necessary to the application of scientific wood-cropping plans—was begun during the period, and the land-classification programme is now 36 per cent. completed, as an area of 2,680,530 acres has been examined in the field.

All forest areas chiefly valuable for agriculture have been earmarked for excision, and as the commercial timbers are removed will be released for settlement. All open areas of pastoral value are also being deleted from within forest boundaries.

Demarcation of the State forests has been 7 per cent. completed, 515,340 acres having been permanently defined as to boundaries, and forty-two standard survey plans for these areas prepared and approved.

The Forest Atlas is being gradually built up by the addition of topographic and forest-type features to these authoritative plans.

(14.) Permanent forest improvements have been built wherever urgently required, and include seven dwellinghouses for officers at outlying stations, patrol-huts, a seed-extraction house, and other buildings; over thirty-five miles of forest telephone-line; several miles of forest roads; and over one hundred miles of new forest tracks. Four modern fire lookout stations and many fire-fighting tool-depots were erected in the State plantations.

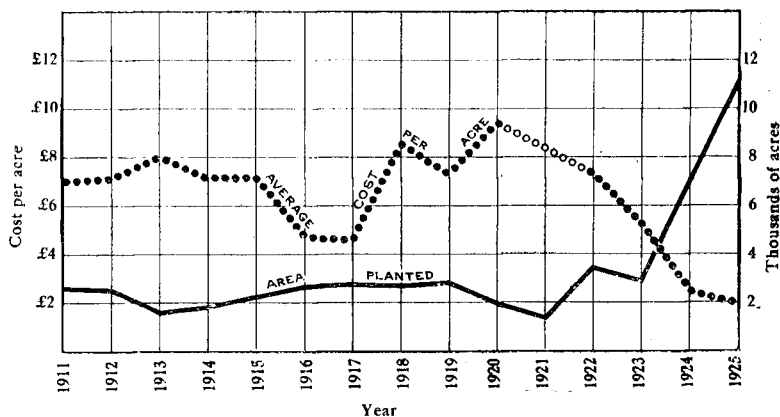
(15.) Preliminary working plans are in operation for Westland Forest Experiment Station and Nursery. Progress during the period in forest-demarcation, forest-improvements, forest statistics, and in silvical, incremental, and utilization studies has been such that forest-management plans can be prepared and applied to certain forests as the necessary technical staff becomes available.

Forest-management investigations completed during the period include volume-tables and mill-conversion studies for the native "pine" (taxad) trees in both Islands, and investigations into the rate of growth in diameter, height, and volume of the most important indigenous and introduced tree species. A Forest Service log-scale has been published.

III. SILVICULTURE.

(16.) Establishment costs in State plantations have been considerably reduced during the period as indicated in the accompanying graph. Because of supernormal costs of labour and material, war-time and immediately post-war years cannot be fairly compared with recent years. The following comparison shows, however, that though labour-costs at the present time are 21 per cent. higher than in 1910–14, yet total planting-costs have been reduced 70 per cent.; for during the two years 1923–24 and 1924–25 17,864 acres were formed at a total cost of £38,969, or of £2 3s. 7d. per acre, compared with the formation in the four pre-war years 1910–11 to 1913–14 of practically half this acreage (8,595 acres), for £62,392, or £7 5s. 2d. per acre. Present low costs of establishment have only been made possible by the introduction of drastic economies in nursery and planting methods, and the development of mass-production practice.

Nursery production costs, expressed as the average cost of raising 1,000 trees, have been reduced 45 per cent., whilst current normal plantation formation costs are £1 19s. 9d. per acre, as compared with £6 18s. 3d. in 1918–19.



GRAPH SHOWING COST OF ESTABLISHING 1 ACRE OF STATE FOREST PLANTATIONS AND AREAS PLANTED, 1911–25.

The annual output of trees from the State nurseries was increased from 3,988,000 trees in 1919-20 to 10,297,000 trees in 1924-25, while the stock of trees on hand in March, 1925, was 24,140,000, compared with 15,890,000 in March, 1920.

Excepting the British Forestry Commission, New Zealand has now the largest output of any State-owned nursery system in the Empire.

(17.) Profitable disposal of thinnings from the large areas of State plantations formed years ago at 4 ft. spacing has been successfully tackled on a small scale, mainly at Rotorua, where marketable intermediate yields in the shape of saw timber, mine-props, poles, and cordwood, obtained from a thinned area of 88 acres, prove that the success of large-scale thinning operations is assured.

(18.) Silvicultural investigations have been carried out into the effect of thinning upon the rate of growth of indigenous forests and plantations; underplanting of indigenous forest with exotic conifers; fixation of sand-dunes and tree-planting thereon; and the planting of exotic tree species on a forest scale in fresh districts, as on the Westland Forest Experiment Station, and on the gum lands of North Auckland. There are now in operation seventy-two permanent sample plots, compared with ten in 1919-20. In addition, many experiments have been made with a view to improving forest nursery and plantation technique and economy, and already results have been applied to large-scale operations with success. Ecological and silvical study of the life-history of the beech forests was completed, that of the kauri forests and of the West Coast forests practically completed, and a study of the tawa forests commenced. These and forest-management studies afford the essential preliminary data for the preparation of scientific forest-management plans designed to regulate the growth and harvesting of timber crops.

IV. FOREST-PROTECTION.

(19.) The problem of forest fires and the adequate protection of the Dominion forests has been satisfactorily solved during the period. A system of prevention and control was placed in operation which resulted in reducing the enormous annual monetary losses in State forests to a loss of only £61 in the fire season of 1924. Public support, the fire-district system, and organized patrols are responsible.

V. FOREST-UTILIZATION.

(20.) *Forest Products Investigations.*—A Branch of Forest Products in charge of the Engineer in Forest Products was formed in 1921, with the main objective of eliminating the enormous waste in the utilization of the Dominion's timber forests. An assistant engineer has been appointed recently. Since 1921 a broad study of all phases of wood conversion and manufacture by both primary and secondary industries has been completed as a basis for a broad scheme of research. A revision of building by-laws is already reflected in closer utilization of timber by the building industry.

Strength properties of native and exotic woods in the form of poles, cross-arms, and ply woods have been determined accurately for the first time in the history of the country. Important improvements have been found possible in the technique of the drying of native woods by air-seasoning and kiln-drying, and in the use of wood-preserved in poles and fencing-posts cut from State plantations. An effective remedy has been found for sap-stain, and the forest and timber insects of the Dominion have been investigated, classified, and described. Other researches include kauri-bleeding, destructive distillation of kauri waste, and the use of native woods for the manufacture of pulp and paper.

The greater part of the forest-products research work already begun has been carried out in co-operation with the University Colleges of Auckland, Wellington, and Canterbury under the direct supervision of the Engineer in Forest Products.

IN REVIEW.

A careful analysis of the results accomplished during the period—which may be known as the period of orientation—will indicate that only a very insignificant part of the foundation for the national forestry policy has been laid—a policy which has for its goal the complete assurance of New Zealand's timber requirements; the conservation of all protection, climatic, and recreational forests; the preservation and control of our wild life; and a leadership in all Dominion-wide forestry interests concerned in the steady and prosperous development of our national life.

The suggested programme of action which follows should, it is submitted, go a long way towards permanently assuring the objectives aimed at.

THE NATIONAL FOREST POLICY.—PROGRAMME OF ACTION FOR THE PERIOD 1925-1935.

(A.) INDIGENOUS MATURE AND GROWING FOREST RESOURCES.

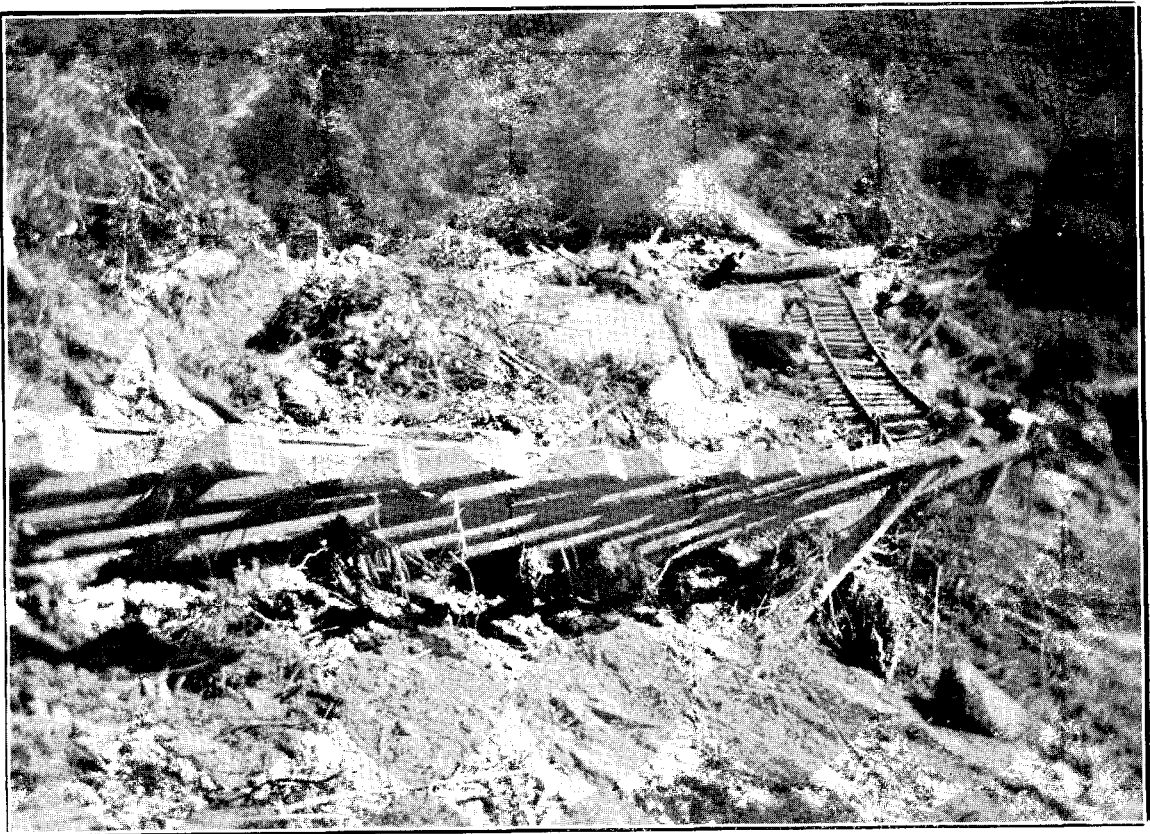
The indigenous mature and growing forest resources of the Dominion, as shown by the first forest inventory, indicate that on 5,589,500 acres of commercial forests there are,—

- (1.) 38,878,040,000 ft. board measure of softwoods (kauri, totara, matai, rimu, miro, white-pine, silver-pine, and kaikawaka).
- (2.) 23,187,560,000 ft. board measure of hardwoods, and broad-leaved trees (beeches and tawa).

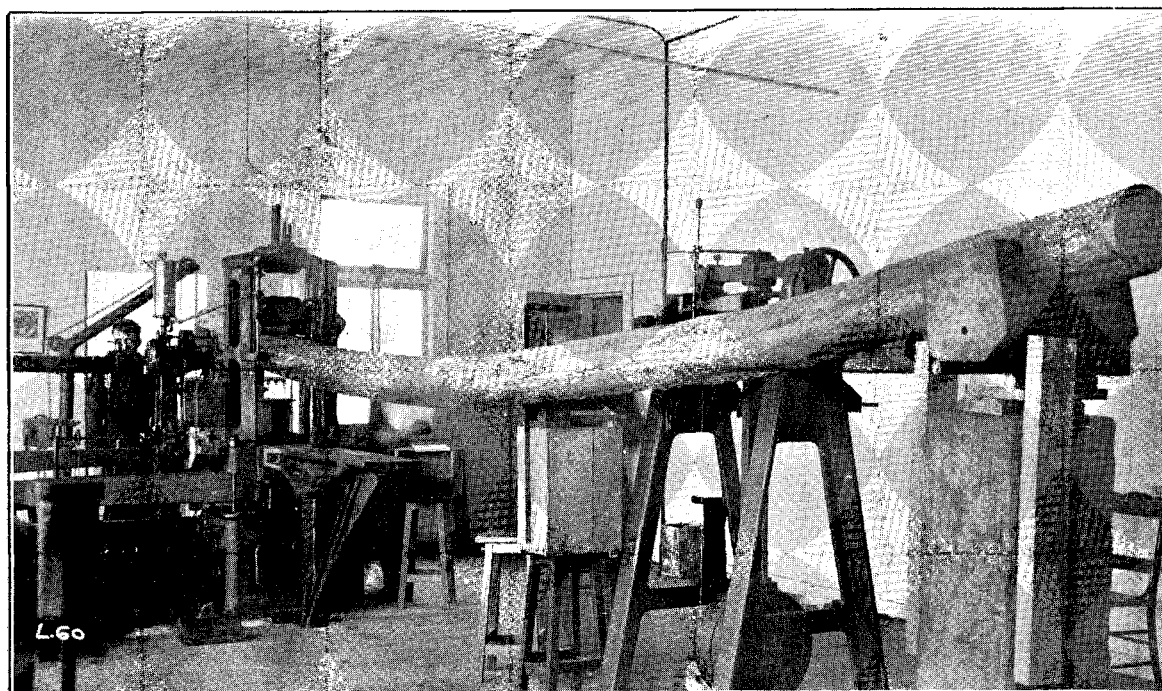
(Ownership: 75 per cent. State, 25 per cent. private.)



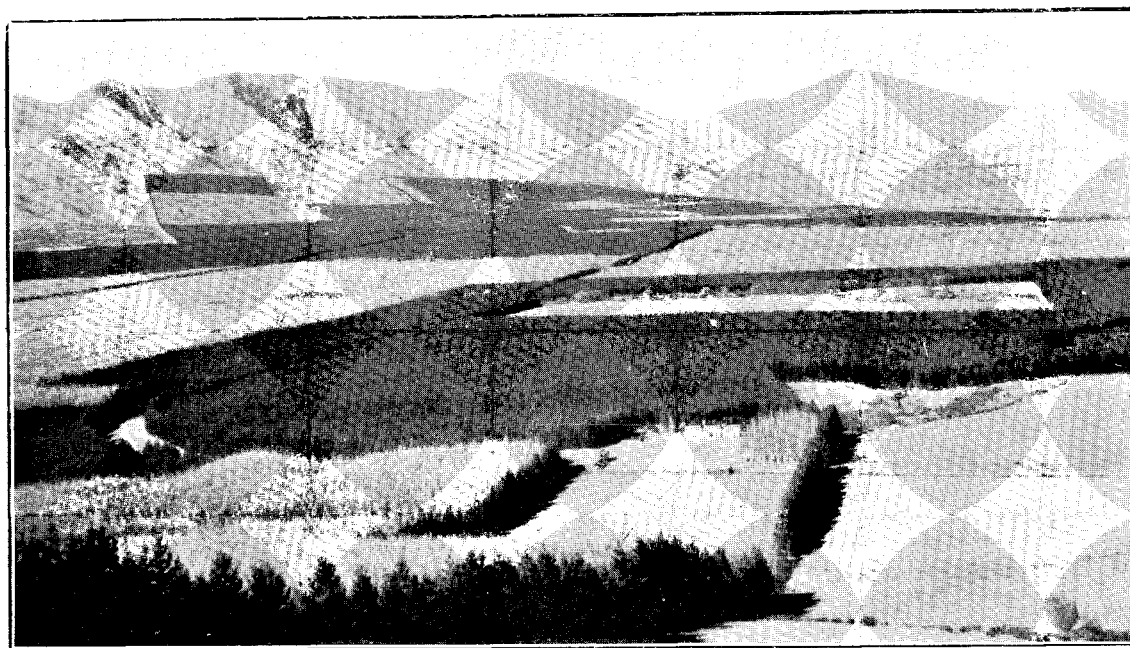
UNDER-STORY OF A NEW ZEALAND TAWA FOREST.



FLOOD DAMAGE, TARANAKI DISTRICT: DESTRUCTION FOLLOWS DENUDATION OF FORESTS ON STEEP HILLSIDES.



TESTING A FULL-SIZE NEW ZEALAND KAIKAWAKA TELEGRAPH-POLE, AUCKLAND FOREST PRODUCTS LABORATORY.



A PARTIAL VIEW OF THE STATE FOREST PLANTATION IN THE HANMER SPRINGS DISTRICT.

The kauri is practically all gone, and a great proportion of what is left is State-owned. The quantities of totara and matai are not considerable, and are chiefly concentrated in the central part of the North Island. The normal life of the white-pine resources is not more than twelve years. Rimu to-day is the principal economic softwood timber, but this timber must gradually give way, in forty years, to plantation and hardwood timbers. The total quantity of economically available softwoods, after deducting all areas of inaccessible, protection, and climatic forests is 25,000,000,000 ft. board measure. The hardwoods will only function in the national timber problem as a subsidiary source of supply because of their general distribution in the mountain and plateau regions, and because owing to their normal refractory qualities they do not lend themselves readily to industrial, constructional, and building uses. (Over 90 per cent. of New Zealand's demand, as of all civilized countries, is for softwood.)

Forest plantations, carrying in the main immature growing forests, to the extent of 141,250 acres (State-owned 62,945 acres, balance held privately and by local bodies) yield at the present time only small (though gradually increasing) supplies.

Annual Consumption of Wood for all Purposes for a Current Average Year.

(In Cubic Feet of Finished Produce.)

Classification.	Building Trade.	Industrial Consumption.	Railway Requirements.	Agricultural or Rural Consumption.	Total.	Percentage of Total Consumption.
	Cub. Ft.	Cub. Ft.	Cub. Ft.	Cub. Ft.	Cub. Ft.	
Sawn timber ..	11,200,000	6,600,000	1,700,000	7,500,000	27,000,000	33.2
Fencing and farm ..	..	..	..	16,100,000	16,100,000	19.8
Firewood ..	..	..	..	29,000,000	29,000,000	35.7
Mining, &c. ..	..	7,000,000	..	..	7,000,000	8.6
Miscellaneous ..	..	2,200,000	..	..	2,200,000	2.7
Totals ..	11,200,000	15,800,000	1,700,000	52,600,000	81,300,000	100.0

With the present population at 1,350,000 the general annual *per capita* consumption of sawn timber alone based on the foregoing table of average conditions is 240 ft. board measure. (It is interesting to note that the Australian unit consumption is only 153 ft b.m., and that over 42 per cent. of the southern continent's requirements are imported, against the importation by New Zealand of only 19½ per cent. of her needs.)

A serious forecast, therefore, of future national timber requirements based on the normal trend of population increase, and on the development and expansion of intensive agriculture and of secondary industry, over a period of years, indicates that the gross national consumption of sawn forest produce (the index factor) by the year 1965 will be 675,000,000 ft. b.m. per annum (other products in proportion). Our virgin softwood resources will be economically exhausted by the period 1965-70.

Is it possible to provide internally for our annual needs, so vital to New Zealand's orderly progress and future prosperity thereafter? Yes, by the application of the tried and proper methods of forest-culture. The State plantations will require to be of such dimensions as to take over the major burden of supplying the raw material at that time. At present there are 63,000 acres of State plantations. *It is recommended that this acreage be increased to 300,000, formation to be completed by the year 1935.*

The forest capital of these plantations and of other forests will, by the year 1965, yield an annual crop of 700 million feet b.m., as follows:—

Source of Supply.	Annual Timber Yield. Feet b.m.
State plantations	450,000,000
Indigenous forests	50,000,000
Local body, proprietary, and private plantations	150,000,000
Importations	50,000,000
Total	700,000,000

With a consumption in the year 1965 of 675 million feet b.m., there is thus a safety margin of supply of 25 million feet b.m. The total outturn from the managed forests will, however, gradually increase from that date onwards to 1,000 million feet b.m. per year. The total cost of establishing the 237,000 acres of State plantations during the period 1925-35 should be not more than £1,250,000, and this sum should be all secured from contemporary and current State Forest Service receipts. The annual harvest from the State plantations for the year 1965 should return £1,125,000 per annum, gradually increasing to £1,500,000 (a conservative estimate), a sum which will aid very materially in reducing the Dominion's general taxation.

(B.) IDLE FOREST LANDS.

Determined by the Dominion forest inventory, there are within the Dominion 4,859,658 acres of idle land, consisting of pumice and barren northern gum lands, fire-devastated wastes, and other deteriorated bush lands reverting to second growth. This enormous area could be put to work producing timber crops, for which the land is entirely suitable.

Wherever possible, local bodies and private individuals who are interested in forestry schemes should be encouraged by the vesting in their control of waste lands and other lands under definite deed for this purpose.

It is recommended that section 30 of the Finance Act, 1922, be amended to authorize the use of loan-money by local bodies for tree-planting.

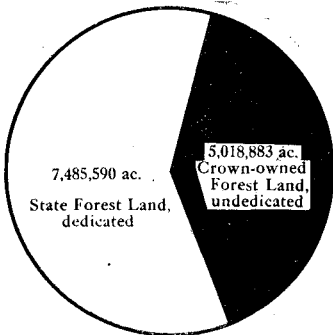
The Government is also recommended to amend legislation so that Crown lands which are not suitable for agriculture or grazing purposes, and which might be termed waste lands, be opened for application for cash, on a suitable tenure not requiring residence, the essential improvement conditions being the planting of a certain portion of the area in trees within a prescribed period.

(C.) DEDICATION OF ALL CROWN FORESTED LANDS TO FORESTRY AND CONSERVATION.

Not only, however, can the waste deforested lands be put to work, but it is urged that the enormous area of over 5,000,000 acres of Crown-owned woodlands and parks now carrying forests of commercial and protection value, and in the control of several Government Departments, be placed under the competent control and management of the forest authority.

This area comprises,—

	Acres.
Unalienated Crown land under forest	1,123,925
Forest and timber reserves, &c., not controlled by the Forest Service ..	321,958
Scenic reserves	445,000
National parks	3,128,000
Total	5,018,883



DEDICATED AND UNDEDICATED CROWN FORESTS.

There are large areas of forest lands such as the Urewera country, Waikaremoana country, and other districts in Nelson, Canterbury, and Southland, which are most essential, but still unconserved and undedicated as State forests, which should be proclaimed. The relation between pastoral, agricultural, and dairying interests, and the sawmilling industry, and the investment of hydro-electric schemes, the mining industry, and the conservation of wild life—in short, the public safety—essentially and urgently demands that the control and protection of all these flood-preventing and timber-producing forests be placed in the hands of the Forest Service. New Zealand's remaining forests, which are practically all now located on lands chiefly valuable for forestry should be forthwith dedicated to this great purpose. The Forest Service is the only State organization in New Zealand that is competent to manage forest lands, and to assure a continuity of policy and a permanence of interest in the care, culture, and control of forests and forested lands.

The Government is therefore recommended to place under the control of the Forest Service the management and administration of State parks, scenic reserves, climatic reserves, educational endowment forest reserves, all other similarly reserved areas, and unalienated forest lands of the Crown. It is sincerely advised that the policy of the Government as set out in 1920 be carried out during the next five years. The policy of the Government in this regard should be crystallized during that period.

(D.) FOREST LAND PURCHASE ACCOUNT.

The establishment of a Forest Land Purchase Fund of £500,000 is advised, to be used for the purchase of forests and forestable lands throughout the Dominion where it is desirable to consolidate existing State forests, to conserve the headwaters of main streams, and to ensure and safeguard the interests of each community. At the present time and for years past very valuable forests have been disposed of by Native owners and others to speculators with no permanent advantage to the community. This fund could be redeemed in twenty-five years' time with interest.

(E.) ESTABLISHMENT OF A FOREST PRODUCTS LABORATORY.

One of the first steps in the practice of conservation is the closer and better utilization of forest products. While our forests are still being cut many times faster than Nature replaces them, the average finished product still contains only one-sixth of the volume of wood cut in the forest. In order to prolong the life of present resources until the planted forests grow to maturity, the wood-using industries of the Dominion must use from one tree what has hitherto been used from three or more trees; and the Forest Service, through its Forest Products Branch, is the one institution working to find sound, practicable ways and means of attaining this end.

A broad survey of all wood-using industries, completed since 1921, has revealed that much of the present waste can be eliminated by the application of scientific methods to industrial processes, and by this means the Forest Products Branch will attempt during the next few years to overcome an inertia which—due largely to geographical isolation—now exists in logging, milling, and wood-manufacturing practices. For example, a more accurate timber-grading system in regard to species, qualities, and sizes will, when permanently established, not only tend to reduce importations of timber, but return larger profits to producers, and at the same time reduce consumers' prices. Applied research, however, is insecure and short-lived without a study of fundamental theory, and *pure research must of necessity be begun on an adequate scale immediately funds and personnel can be made available*. If there is to be true economy of effort, the present policy of decentralizing the work of forest-products research in co-operating institutions, with the use of ever-changing temporary personnel, must be early revised. Continuity in the conduct of research demands that the work be centralized in a well equipped forest-products laboratory, manned by a small staff of highly trained technicians drawn from the professions of forestry, engineering, and analytical chemistry. Research, pure and applied, is urgently called for into wood-preservation, air-seasoning and kiln-drying, physical and strength properties of native and exotic woods, and, most important of all, the possibilities of fully utilizing wood in the chemical industries, such as pulp and paper, wall-boards, artificial wood, and minor forest products such as resin, oils, cellulose, and others.

Not only is elimination of timber waste a most practical and economical means of relieving our impending shortage of forest-grown material, but it can be attacked with prospects of early national economic benefits. It will, moreover, help to make the growing of trees more profitable, thus encouraging local body, private, and proprietary interests to assume more of the responsibility of providing the timber-supply of the future.

The Government is earnestly recommended to authorize the establishment of a Forest Products Laboratory for the study of our native timbers, waste problem, and the discovery of practical applications for our weed trees and millions of tons of waste wood: this Forest Products Laboratory to be equipped with wood-seasoning apparatus, timber-testing equipment, and all the other necessary machinery for this work.

(F.) CONTROL OF WILD LIFE OF THE DOMINION.

The control of the wild life of the Dominion, such as deer and pigs and other vermin inhabiting forests, at the present time is regulated by many bodies. Apparently no co-ordination prevails, with the result that the deer, as a vermin, is becoming most serious. The Forest Service, as the competent authority controlling the forests of this country, is prepared to assume complete responsibility for the control and regulation of wild life. The Government is therefore recommended to place this complete control in the hands of the Forest Service by 1930.

(G.) PROPRIETARY FOREST-PLANTING COMPANIES.

Proprietary forest-planting companies have now become so active in the promotion of planting schemes that it is desirable that some form of statutory control be exercised over these activities. The Government is recommended, therefore, to take this line of action with regard to all private and public afforestation syndicates and companies organized for the purpose of producing timber crops. It is understood at least £500,000 has been invested in this form of enterprise by the public of New Zealand and Australia.

(H.) GENERAL.

Staff of the State Forest Service.—Provision should be made for twenty-five trained foresters, so essential to the proper working out and application of scientific cultural methods of the production of timber crops.

Forest-management Control.—Silvicultural and control cutting plans should be established for all the State forests by Order in Council during the next five years, and for the better management of these areas sixteen forest working circles should be established, each in charge of a forest warden.

Control of Timber Pests.—It is recommended that regulations be gazetted to prohibit the importation of all wood products infested with insect pests.

Forest Educational Propaganda.—A still much wider programme of forest educational propaganda is recommended.

Forest Experiment Station in the North Island and National Arboretum.—The establishment and operation of a forest experiment station in the North Island is strongly recommended, also the sustained operation of the national arboretum now being established at Rotorua.

The need for continuity of policy and stability of programme for the next ten years is most essential. I therefore urge the Government to stabilize this programme as far as possible.

CONCLUSION.

Individual, public, and political support of the forestry movement, forest-conservation, and the growing of timber for profit is to-day from the North Cape to the Bluff most definite and spontaneous. Progress Leagues, Farmers' Unions, Chambers of Commerce, and dozens of other public organizations have pledged themselves to the continuance and wider extension of the policy laid down in 1920. The fiscal position of the State Forests Account is excellent, for its gross revenues are now in the neighbourhood of £160,000 to £200,000 per annum, and are sufficient to complete the building-up of a National Forest Trust, adequate to the needs of New Zealand for all time.

These proposals have been framed after careful consideration of the problems of forestry in this Dominion for the past five to six years. Experience has shown the desirability and need of action, and the success of this action during the past five years now warrants the adoption of these proposals. The writer is confident that the acceptance of these recommendations and proposals will more than adequately ensure the results desired—that is, the conservation and reasoned use of New Zealand's timber resources, and the provision of a permanent national forest heritage, from which can be secured the necessary timber-supplies for the economy of New Zealand.

L. MACINTOSH ELLIS,
Director of Forestry.

SECTION 2.

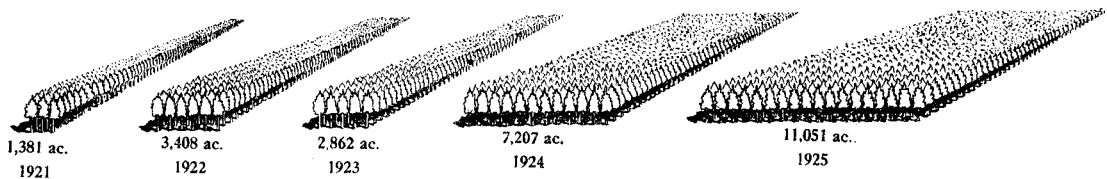
ANNUAL REPORT OF THE DIRECTOR OF FORESTRY FOR THE YEAR
ENDED 31ST MARCH, 1925.

CHAPTER I.—FORESTRY PROGRESS: A BRIEF REVIEW.

New high levels in State and private forest achievements, in many respects unique within the British Empire, are recorded for the year ended 31st March, 1925.

STATE FORESTATION ACTIVITIES.

A total area of 11,051 acres was planted with forest-trees in the State plantations of the North and South Islands. The formation cost, including labour and cost of trees, was £1 8s. 11d. per acre over 80 per cent. of the area planted, compared with £1 13s. 7d. for the previous year, and £5 5s. 7d. for the year 1922-23. This means a reduction of 14 per cent. on the 1923-24 cost, and 72½ per cent. on that for 1922-23. In the South Island costs are normally higher, because of expensive scrub-clearing and rabbit-fencing. The State forest plantations now cover 62,906 acres.



COMPARISON OF ANNUAL TREE-PLANTING OPERATIONS IN STATE FOREST PLANTATIONS FOR THE YEARS 1921-25.

PRIVATE AND LOCAL GOVERNMENT FORESTATION OPERATIONS.

A Dominion-wide interest and participation on the part of local governing bodies was solidly and generally expressed by forest-planting action during the year.

City, Municipal, and County Councils, Harbour Boards, and Electric-power Boards to the number of seventeen carried out communal forest plantings on 1,600 acres, while industrial companies, co-operative dairy manufacturers, proprietary afforestation companies, syndicates, and private plantation operations formed 9,000 acres of man-made forests. Company projects were initiated for the establishment of at least 30,000 acres of timber farms.

In this connection, however, a note of warning and of caution is offered in reference to over-enthusiastic statements which have been made, and are being made, with regard to the growth and value of *Pinus radiata* (or *Pinus insignis*) plantations by tree-planting companies, the figures being in some cases absolutely impossible. With regard to yield and production figures of this and other pine species, the truth is quite sufficient and ample without exaggerating the ultimate yields.

The unique progress that has been made in improved nursery propagation practice in several of the Service nurseries is to be specially commended, for those improvements are directly resulting in cheaper and better trees, and the permanent installation of true mass production methods. Substantial reduction in the high labour-costs (from 75 to 80 per cent.) of tree-propagation is being effected, with consequent benefits to the community.

Tree-planting for profit is a habit now in the Dominion, and there is probably no country in the world that lends itself so admirably to timber-farming.

STATE FORESTS.

The total area of State forests under the management of the Forest Service was increased by 52,409 acres during the year. The grand total acreage of nationally owned forests dedicated to timber-crop production is now 7,485,590 acres, compared with 4,144,076 acres in December, 1919—an increase of 80 per cent.

During the year 2,152,263 acres were jointly classified and demarcated by the Forest Service and the Department of Lands and Survey, whilst 83,669 acres were added to the permanent State forest list.

The ratio of the area of State forests to the total area of the Dominion is now 11·3 per cent., compared with 6·2 per cent. in the year 1919.

FOREST-PROTECTION.

The prevention of forest-fires in State forests, owing to loyal public support and the operation of forest fire districts, was most effective during the year, and nearly a perfect record was established. The resultant damage due to twelve fires over an area of 126 acres of timber-land was only £61.

In the suppression of deer and wild-pig menace bounty-money was paid on 7,433 deer tails, and 9,000 pigs' snouts—"a mere drop in the bucket" compared with the total number of these pests.

FOREST-PRODUCTS RESEARCH.

Signal progress has been recorded in the field of forest-products research. The scope of investigation was wide, and achievements are recorded under five main divisions.

Timber Mechanics.—Determination of the mechanical properties of the five timber species, red, black, and hard beeches, kauri, and kamahi. Strength tests of full-sized poles of kaikawaka, silver-pine, *Eucalyptus amygdalina*, *E. ovata*, and *E. obliqua*, and cross-arm tests of red-beech and hinau.

Timber Physics.—Determination of the shrinkage of all native and introduced timbers, preliminary to a study of same in seasoning and kiln-drying methods.

Wood-preservation.—The treatment with creosote of the native hardwoods, kamahi, and red, silver, and mountain beeches, by the Rueping pressure process. Development of a preventive for sap-stain in white-pine and other timbers. Study of the preservative treatment of New-Zealand-grown eucalypts.

Derived Products.—The destructive distillation of kauri waste, bleeding of kauri-trees, and the deresinating and pulping value of kauri and other timbers.

Industrial Investigation.—Conduction of the 1924 Building Conference directed towards elimination of waste in building industry. Study of grading rules.

FOREST FINANCE.

The total receipts of £161,468, as compared with £93,479 for the previous year, created a new record for this Department.

These receipts were applied to the extent of nearly £80,000 in the creation of forest plantations, and other permanent forest improvements and capital; the sum of £40,000 (approximately) was expended in forest-protection, administration, and forest-management, whilst the surplus of £41,468 was allocated to various county backblock road improvements and reserved for the formation of additional commercial State plantations.

A capital sum of £100,000 was paid from Forest Debenture Account into the Lands Purchase Account for the purchase of 53,196 acres of the Selwyn Estate, Māmakū.

The National Endowment Account also benefited to the extent of £12,611 during the year.

REVIEW OF FOREST SERVICE FINANCE.

Period. Years.	Receipts. £	Payments. £	Period. Years.	Receipts. £	Payments. £
1924-25	161,468	114,298	1921-22	30,784	107,582
1923-24	93,479	98,304	1920-21	19,518	79,551
1922-23	63,372	85,410	1919-20	8,513	66,819

PRODUCTION OF SAWN TIMBER.

Another annual record was set in the quantity of sawn timber produced by millers cutting on State forests, over 102,369,900 ft. b.m. being manufactured during the year, as compared with 52,297,000 ft. b.m. in the previous year. The State forests produced 32 per cent. of the entire Dominion cut, and in another decade this proportion will be 75 per cent. The total production from all sources was 318,000,000 ft. b.m. The gross total ripe timber stumpage sold from State forests—namely, 69,253,000 ft. b.m.—to operating millers was approximately the same as in the year 1923-24: i.e., after excluding the large quantity disposed of to other Government Departments.

GENERAL.

The establishment at Auckland University College and at Canterbury University College of Schools of Forestry for the teaching of forest technicians and subordinate forest officers was finalized during the year. Progress in New Zealand forestry will be greatly facilitated thereby.

NATIONAL ARBORETUM AT ROTORUA.

During the year 50 acres were acquired at Rotorua for forming a national arboretum. The preliminary operations are well under way, and the area will be in complete working-order by the year 1929. About four hundred different conifers will be represented, and the arboretum will prove of great educative value to botanists, arboriculturists, and foresters, as well as the general public.

CONSERVATION OF WILD LIFE.

A fine sense of public and individual responsibility is becoming more evident throughout the Dominion with regard to the conservation of our wild bird and animal life, and in many districts our useful avifauna is again increasing, to the happiness and delight of all. The Service co-operated with the Department of Internal Affairs and the Native Bird Protection Society in enforcing the bird-conservation laws—prosecutions were instituted and conviction gained.

The “forestry in the schools” idea, so enthusiastically entered into by the Department of Education, is assisting in stimulating a latent love of nature and of the outdoors in the young citizens of New Zealand. Schools to the number of 765 have entered into the school nursery and plantation movement.

“Forestry as a useful economy is finding its true place in the life of the Dominion.”

CHAPTER II.—THE STATE FOREST SERVICE.

The total number of officers on the permanent staff of the Service at the end of the year was 95, as compared with 97 for the year ending 31st March, 1921. The volume of business and of work accomplished during the year was greater than at any time in the history of forestry in New Zealand, a result only possible through the smooth and harmonious working of the Forest Service machine. Loyalty and co-operation have enabled the Service to run at top speed and thus accomplish the objectives set out for the period. During the year seven officers resigned from the Service, six by reason of betterment of position, and one on account of ill health. It is gratifying to know that the officers of this Service are finding a field and outlet for their knowledge and ability in forestry work in the Dominion outside of the State activities. This turnover is remarkably low, and so far the Service has been able to cope with the resignations by the promotion of subordinate officers and probationers. Now that forest-engineering educational facilities have been established at Auckland and Canterbury University Colleges, it is hoped that an adequate supply of trained men will soon be available from these colleges. The fundamental requirement for the forest works of the Dominion is an efficient force of officers, qualified by training and experience to handle the ever-increasing business of the Service, which is now larger than that of any other forest authority in the British Empire south of the Equator. At the present time the staff of this Service by lack of technically trained personnel is very much undermanned on the production side. During the year the Rangers' Instruction Training-camp was held at Whakarewarewa, and was attended by junior officers of the Service. The results obtained by way of an increased efficiency justify the continuance of this school during the current year.

STATE FOREST SERVICE ORGANIZATION.—DISTRIBUTION OF PERMANENT STAFF AS AT 31ST MARCH, 1925.

Forest-conservation Region.	Director.	Secretary.	Chief Inspector.	Conservator of Forests.	Special Officer.	Forest Assistant.	Surveyor.	Clerical Staff.	Draughtsmen.	Forest Rangers, A Grade.	Forest Rangers, B Grade.	Forest Guards.	Nurserymen.	Other.	Total Number as at 31st March, 1925.	Total Number as at 31st March, 1924.	Total Number as at 31st March, 1923.	Total Number as at 31st March, 1922.	Total Number as at 31st March, 1921.
Auckland ..	..	..	..	1	..	..	..	1	..	2	2	..	..	..	6	6	6	7	8
Rotorua ..	..	..	..	1	..	..	..	3	..	2	7	5	..	1	19	20	21	20	20
Wellington ..	..	..	..	..	..	..	..	2	..	3	2	1	..	..	8	7	7	6	6
Nelson ..	..	..	..	..	..	..	..	1	..	1	4	1	..	..	7	7	7	6	7
Westland ..	..	..	..	1	..	..	..	1	..	2	1	..	..	..	5	6	6	8	7
Canterbury-Otago ..	..	..	..	1	..	..	..	3	..	4	6	3	3	..	20	19	18	21	18
Southland ..	..	..	..	1	..	..	..	1	..	1	3	..	..	..	6	6	6	6	7
Central Office ..	1	1	1	..	2	1	1	10	6	..	1	..	..	..	24	25	24	25	24
Totals ..	1	1	1	5	2	1	1	22	6	15	26	10	3	1	95	96	95	99	97

CHAPTER III.—THE STATE FORESTS.

1. CONSTITUTION OF STATE FORESTS.

The total area of State forests under the management of the State Forest Service at the 31st March, 1925, was 7,485,590 acres, a net increase of 52,409 acres during the year. The total area added by Proclamation during 1924-25 was 116,000 acres, and the areas withdrawn comprised mainly the Buller Coalfield reserves vested in the control of the Westport Harbour Board (56,000 acres), and areas required for settlement purposes and reverting to administration by the Lands Department. Of the total area of State forests at the 31st March, 1925, there were 1,758,513 acres of permanent State forest, 5,630,688 acres of provisional State forest, and 96,409 acres of "forest reserves." Comparison with figures for the 31st March, 1924, discloses that a net area of 83,669 acres was added to the permanent State forest reserves, including over 70,000 acres purchased, while 31,162 acres (net) were withdrawn from provisional or temporary reservation. This shows marked progress during the year in regard to the policy of permanent dedication of suitable areas for legitimate forestry purposes. Details of areas appear in Annexure I.

FOREST RECONNAISSANCE ; LAND CLASSIFICATION, DEMARCATION, AND SURVEY.

Reconnaissance surveys of 40,000 acres in the Okarito district, Westland, and of 11,000 acres, mainly in the central Main Trunk district, were completed during the year. Further reconnaissance, principally in the Port Craig district, Southland, and in other regions, for the purpose of classifying land and timber types and estimating commercial- and protection-forest values was also made. 18,104 acres of forested land in the North Auckland Land District were classified, and field-work in connection with the classification and demarcation of 79,032 acres of provisional State forest included in pastoral runs in the Otago Land District and of 2,083,231 acres of provisional State forest and other State-owned land in the Westland Land District was finalized in conjunction with officers of the Department of Lands and Survey.

A survey of 33,855 acres, comprising the Waiotapu Plantation, Kaingaroa Plantation extension, and the residue of Reporoa Settlement acquired for plantation purposes, together with all internal and access roads, was completed and plans prepared and approved by the Chief Surveyor. A survey of the Westland experimental area of approximately 8,000 acres is now in progress.

CO-OPERATION IN TIMBER-STUMPAGE EXAMINATION, AND REPORTS FOR OTHER DEPARTMENTS.

The Service has again extended its facilities during the year for timber-land examination and forestry generally to other Government Departments, local bodies, and Native Land Boards. In all, thirty-two examinations, comprising 51,724 acres of land, have been examined on their account.

2. FINANCE.

The year just closed again records a new peak in forest receipts. The total income from all sources was £161,468, of which sum the nurseries and plantations yielded £11,290. The total increase in receipts was 72 per cent. over the previous year, and 154 per cent. over the year 1922-23. The State Forest Service expenditure for the year was as follows :—

STATE FOREST SERVICE EXPENDITURE.

Item.	Fiscal Year ended		
	31st March, 1925.	31st March, 1924.	31st March, 1923.
A. Salaries	£ 31,429	£ 30,686	£ 30,092
B. Management and development of State forests	17,618	16,271	13,799
C. Forest-fire prevention and patrol (indigenous forest) ..	1,557	1,977	1,808
D. Education : Reference library, publications, &c.	927	582	574
E. Forest research and products investigations	4,589	3,738	2,224
F. Afforestation : Plantations, nurseries, and general ..	51,854	38,006	35,155
G. Acquisition of indigenous forests	106,067*	4,548	1,064
H. Grants to local bodies, &c.	257	2,496	694
	214,298	98,304	85,410

* Includes £100,000 transferred to the Land for Settlements Account for the acquisition as a State Forest of part Selwyn Settlement Estate, Mamaku Plateau.

During the year the sum of £12,611 11s. 7d. was paid to the National Endowment Account, being the amount due to that account at the 31st March, 1924, under section 39 of the Forests Act, 1921-22.

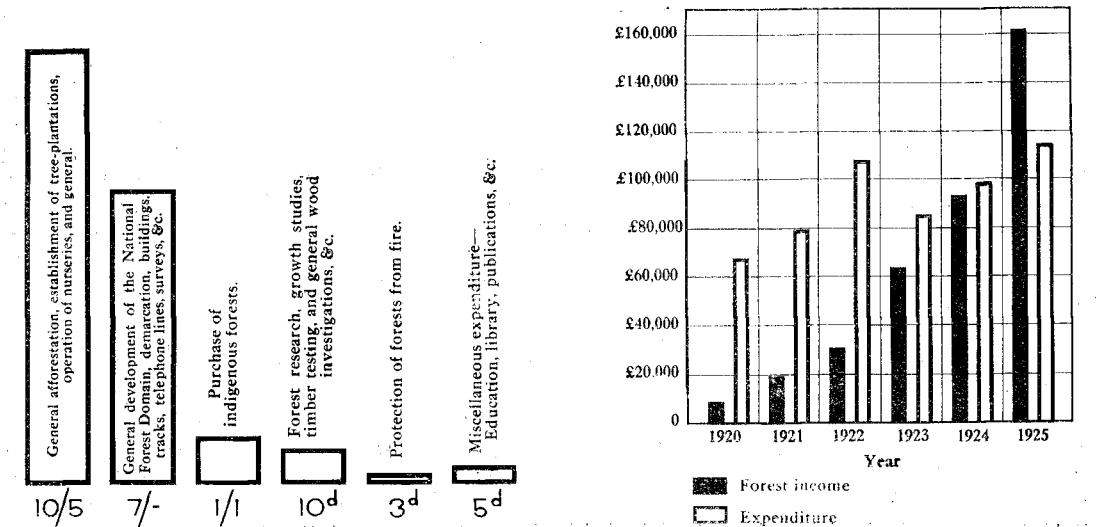


DIAGRAM SHOWING THE APPORTIONMENT OF EACH £1 OF THE SERVICE EXPENDITURE FOR THE FISCAL YEAR ENDED THE 31ST MARCH, 1925.

COMPARISON OF THE FOREST INCOME AND EXPENDITURES FOR THE PERIOD 1920-25.

3. MANAGEMENT.

TIMBER.

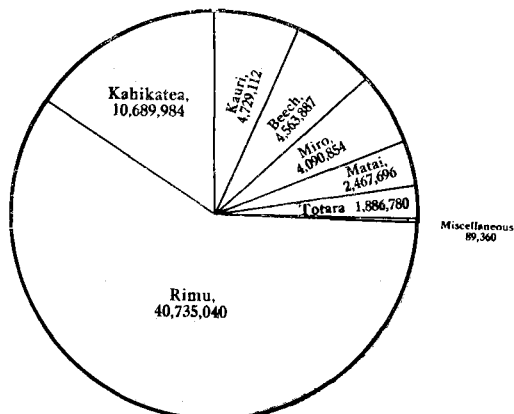
A new record was reached in the year in timber-sale receipts and in the quantity of ripe-condition timber cut from State forests. The sum of £134,731 was received in sales, the largest amount by many thousands from the exploitation of State stumpage, while 102,369,900 ft. board measure were produced from mills cutting State forest timber.

Fiscal Year.	Number of Sales.	Value of Timber sold.	Quantity of Timber sold.	Receipts from Timber sold.	Quantity cut from State Forests during the Year.
		£	Sup. Ft.	£	Sup. Ft.
1924-25	54	96,158	69,253,000	134,731*	102,369,900
1923-24	61	266,388	212,085,000	68,295	52,297,000
1922-23	52	95,357	78,830,000	47,462	..
1921-22	40	38,208	35,669,000	24,320	..
1920-21	5	17,055	6,987,000	16,815	..

* Includes receipts from State forests, including national-endowment credits.

These facts demonstrate more than anything else the steadily increasing popular interest in the Forest Service timber-sale practice of offering to *bona fide* millers parcels of exploitable and accessible timber for immediate manufacture. The obvious advantages to sawmillers of being able to pay for the raw material as it is cut and sold is apparent to all, and more particularly to the smaller operators for whom the Service is especially catering. Keen competition is in evidence for the Service offerings generally throughout the Dominion, and in several regions new price-levels were reached for particularly accessible blocks (the Auckland Main Trunk and Westland regions).

The Westland region has again set itself a new record in the total forest produce manufactured—namely, 73,137,938 ft. board measure, as compared with 62,211,638 ft. b.m. for the year 1923-24, and 46,080,983 ft. b.m. in the year 1922-23. The sawn-timber-producing centres in the North Island are gradually lessening in importance, as virgin supplies are disappearing and becoming more inaccessible there.



STATISTICS OF THE SERVICE TIMBER-SALES FOR THE YEAR ENDING 31ST MARCH, 1925. QUANTITIES SHOWN IN SUPERFICIAL FEET.

Extraordinary interest was evidenced during the year by co-operative dairy manufacturers as to the remaining supplies of white-pine, and every sale offering of any considerable volume was eagerly competed for by millers. It is a curious fact that whilst 1,213,354 ft. board measure of spruce and hemlock butter-box shooks, or 340,698 boxes, were imported from Sweden, United States of America, and Canada into New Zealand, the Australian purchases of our white-pine have been sustained on new high price-levels. The Australian manufacturer apparently appreciates the fine quality of this timber to a greater extent than our own producers.

FOREST-IMPROVEMENTS.

Greater progress under this head is recorded for the past year. The erection of two rangers' stations, one nurseryman's cottage, and one forest guard's station was completed or undertaken, and two cottages were relined and reroofed. (It is to be noted that the policy of the Service is to provide reasonable accommodation for its forest officers at outlying stations and where it is not possible for them to secure housing-accommodation in villages and elsewhere.) One patrol cabin was erected in the Mamaku patrol district. Fourteen miles of forest telephone-line were erected. Twenty miles of new forest tracks were formed and lengths of old track repaired. Other new works constructed include 100 chains of first-class road, fifty-three miles of fire-break in plantations, three fire-tool depots in plantations (complete with fire-fighting tools), and a wire suspension bridge giving access to an important State forest.

GRAZING.

Investigations finalized during the year have proved that grazing is progressively injurious to the forest according to its intensity and duration. The Service on that account has now adopted the policy of discouraging such, and as demarcation and dedication for forestry clearly defines the areas grazing will be eliminated from all but open land so dedicated. A thorough accounting has now been made of grazing-values on lands controlled by the Service, and during the year under review the revenue derived from this source only amounted to £2,735.

OPOSSUMS.

A comprehensive investigation into the life and history and economic position of the opossum in its relation to forestry and other interests was commenced during the year, but owing to pressure of other work this had to be discontinued before many phases of the investigation could be studied to definite conclusions. An interim report covering the investigation was prepared and circulated, and as opportunity offers further investigations will be made, and tentative conclusions arrived at in that report will be finalized. The trapping season 1924 shows a falling-off in the number of opossums trapped: 95,639 skins were taken, as against 109,905 the previous season. In some forests, previously the best trapping-grounds, results were so poor that many trappers abandoned their areas. This confirms previous statements issued by the Service that the opossum is easily kept down, and will never become a menace. It is estimated that 70 per cent. of the opossums trapped during the season were taken from State forests. The share of licenses and royalties credited to the State Forests Account was £2,784 12s. 2d.

RECREATIONAL USES OF THE FORESTS.

As the development of the Dominion creates better access a greater interest in the incomparable beauties of our forests, and the opportunity which they provide for health-giving recreation, is evidenced by tourists, trappers, fishermen, shootists, and the general public. Appreciation of the policy of the Service in adopting an open-door attitude in regard to reasoned and careful recreational use of State forests, the policy of preserving areas of scenic beauty by their elimination from milling-areas and protection from fire, the provision of camping-sites and fireplaces as finance permits, is shown in the remarks of the yearly increasing number of pleasure and health seekers resorting to the forests. It is now proposed to place permanent forest-users upon a better footing by granting permanent camping and hut-building sites upon the payment of a nominal sum.

NATIVE BIRD-LIFE.

It is pleasing to note that reports from every region throughout the Dominion denote in most cases an increase in the native avifauna. This state of affairs has without doubt been largely brought about through the efforts of that active body "The New Zealand Native Birds Protection Society," whose work and propaganda has reached all corners of the Dominion and created a feeling towards the preservation of our native birds which has previously been remarkable by its absence. The Service, realizing the value of and the relation of bird-life to the forest, gives its whole-hearted support to this society, and officers use every opportunity to stress the need for perpetuating our native birds.

HONORARY FOREST RANGERS.

Ten additional honorary forest rangers were appointed, bringing the total strength of this volunteer force to sixty-six.

The State Forest Service again wishes to go on record as acknowledging its deep appreciation to this body of honorary guards of the national forest domain. Most substantial assistance was rendered during the year by this corps of honorary officers throughout the Dominion in aiding in the protection of the forests against fire, the suppression of vandalism, and in the general conservation of the forests and the wild life contained therein. The splendid co-operation that is being secured in extending the forestry movement throughout the Dominion is very much worth while.

FOREST-PROTECTION.

In forest-fire prevention another record has been set up, due largely to loyal public co-operation and to the creation and operation of fire districts. The fire season, with the exception of Southland, was not a season of high hazard. The Service made its greatest losses in point of land burned over in the Auckland, Wellington, Westland, and Southland regions, where land to the extent of 1,927 acres was traversed by fire. Of this total, 126 acres carried valuable milling-timber. The total number of fires on State forests was twelve, as compared with thirty-three in the previous year. The monetary loss was only £61.

OFFENCES UNDER THE FORESTS ACT AND REGULATIONS.

There were four prosecutions during the year against offenders, convictions being secured in each case. For kauri-gum stealing one offender was sentenced to six months' imprisonment with hard labour, two others were fined, and a fourth fined and put on probation for two years. One offender was fined for committing a fire offence. Several cases of over-cutting of timber were detected and were appropriately dealt with.

WILD PIGS.

During the year an extended effort by the Departments of Agriculture, Lands, and the Forest Service, organized and controlled by the latter, was made to control the wild-pig nuisance in the hinterland of Taranaki. Up to the end of the year nearly ten thousand pigs were destroyed, a reduction in numbers which must prove of inestimable benefit to settlers residing in the area where operations were undertaken.

ANALYSIS OF ALL REPORTED FOREST-FIRES ON AND CONTIGUOUS TO STATE FORESTS.

Forest-conservation Region.	Forest-fires: Number, Character, and Area.										Money Value of Forest-wealth destroyed.					
	Number detected.		Timber Land burned. (Acres.)		Cut-over Land burned. (Acres.)		Scrub Land burned. (Acres.)		Total Area burned over. (Acres.)		Merchantable Timber.		Valuable Regrowth.		Total Value.	
	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.
Auckland ..	2	301	25	1,670	..	2,200	200	4,150	225	8,020	7½	7,200	..	..	7½	7,200
Rotorua ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wellington ..	2	67	..	..	150	2,005	700	..	850	2,005	..	..	..	..	..	..
Nelson-Marlborough ..	..	..	..	1,050	25	..	..	..	25	1,050	..	..	..	..	..	..
Westland ..	5	..	..	..	307	1,480	..	2	307	1,482	..	..	..	..	..	..
Canterbury-Otago ..	..	1	..	..	..	..	5	200	5	200	..	..	..	..	..	..
Southland ..	3	17	1	50	514	600	..	..	515	650	..	146	53½	..	53½	146
Totals	12	386	26	2,770	996	6,285	905	4,352	1,927	13,407	7½	7,346	53½	..	60½	7,346

Forest-conservation Region.	Cost of Protection, Prevention, Detection, and Control of State Forests.										Origin of Forest-fires.											
	Fire Patrol Force. (Number of Men.)	Wages Cost.	Fire equipment Cost.	Locomotion Cost.	Total Cost.	Sawmilling Operators.		Travellers, Trappers, Sportsmen.		Land-clearing Operators.		Unknown Agencies.										
						S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.									
Auckland	4	Period of Employment: November to March.	£ 762	s. 0	d. 4	£ 5	s. 11	d. 10	£ 124	s. 4	d. 0	£ 891	s. 16	d. 2	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.	S.F.	Priv.
Rotorua ..	7		690	7	5	3	0	0	..	693	7	5	..	..	..	..	..	..	..	..	..	
Wellington	5		81	0	4	..	..	38	1	7	119	1	11	1	..	..	..	..	67	1	..	..
Nelson-Marlborough	2		11	12	1	21	5	11	118	4	7	151	2	7	..	..	..	..	..	..	..	..
Westland ..	11		127	13	4	..	..	3	8	1	131	1	5	1	..	..	..	..	..	4	..	..
Canterbury-Otago	13	519	2	7	37	4	2	10	0	556	16	9	..	..	..	..	..	1	..	..	..	
Southland..	2	98	18	2	37	5	7	47	5	9	183	9	6	2	3	1	..	..	10	..	4	
Totals	42	..	2,290	14	3	104	7	6	331	14	0	2,726	15	9	5	3	1	..	..	379	6	4

DEER.

As a result of exhaustive investigations made during the year by the Service throughout the Dominion the whole position was reviewed in the last annual Conference, held at Whakarewarewa on the 22nd April, 1925, and the following recommendation was unanimously passed by the executive officers assembled there: "That protection on all species of deer be removed for a period of five years, and that the payment of bounty be continued on all deer destroyed during that period."

4. AFFORESTATION AND FOREST-EXTENSION.

The total area of State-forest plantations formed during the year was 11,051—a British Empire record in acreage and in formation cost. The total area of 62,945 acres now in growing forest capital is situated in the Rotorua-Kaingaroa pumice plains region, Hanmer Springs, Naseby, and Tapanui districts, with smaller acreages in Westland and at the Rangitikei River heads.

Mass production methods in the tree nurseries and a high standard of service by the officers and men in charge of planting are responsible for this splendid result—a result which will stand favourable comparison with State or private operations in any country.

SUMMARY OF OPERATIONS ON STATE PLANTATIONS DURING THE YEAR ENDED 31ST MARCH, 1925.

Forest Plantation.	Number of Trees planted.	New Area planted.	Total Area planted in Trees, 1896-1925.
		Acres.	Acres.
Whakarewarewa	400	..	8,037
Waiotapu	..	..	7,010
Kaingaroa	5,628,670*	8,612	29,203
Puhipuhi	..	..	1,200
Conical Hills	..	..	3,533
Pukerau	..	..	573
Dusky Hill	..	..	746
Greenvale	408,050	600	2,651
Gimmerburn	..	..	88
Naseby	70,815	79	2,297
Hanmer Springs	484,825	821	4,233
Balmoral	471,850	692	2,488
Raincliff	..	..	206
Westland Forest Experiment Station ..	130,200	200	340
Experimental group	..	..	15
Dumgree	32,500	48	257
Tangimoana	47,000	68	68
Totals	7,227,310	11,120	62,945

* Includes estimated trees (124,600) raised *in situ* on 178 acres.

FOREST-EXTENSION.

The forest-extension and educational efforts of the Service during the year have given most gratifying concrete results, for the quantity of young trees disposed of to farmer settlers, local bodies, and proprietary companies reached 2,930,564 for the year, as compared with 1,839,512 in 1923-24 and 277,000 for the year 1920. The steadily expanding sales of high-quality forest-trees can be accounted for by the consistent policy of the Service in passing on all economies in production costs to the purchasers, and to wider public appreciation of the definite profitable nature of the timber-farming business.

Tree and tree-seed disposals to farmers, settlers, local bodies, proprietary and co-operative companies, &c., from State nurseries are exposed as follows:—

1919 to 1925.

Year.							Trees for planting. (Number.)	Forest-tree Seeds. (Weight in Pounds.)
1925	..	..	..	..	..	..	2,831,932	1,220
1924	..	..	..	..	..	..	1,839,512	618
1923	..	..	..	..	..	..	1,475,581	746
1922	..	..	..	..	..	..	897,552	436
1921	..	..	..	..	..	..	520,702	240
1920	..	..	..	..	..	..	277,235	130
1919	..	..	..	..	..	..	420,412	132

The large number of proprietary forest-plantation companies which have been launched, and in some cases have begun planting operations, is an indication of the wider public interest in forestry matters.

CHAPTER IV.—RESEARCH AND EXPERIMENTS.

1. FOREST-MANAGEMENT.

SILVICAL RESEARCH.

Beech Forests.

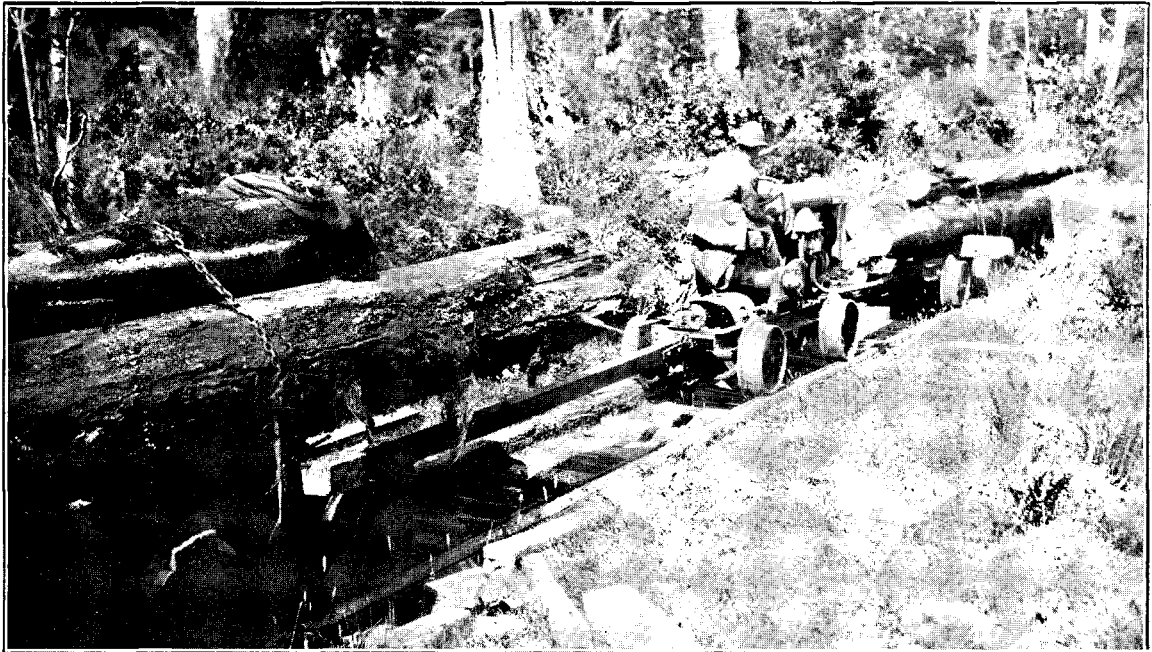
During the past year Dr. L. Cockayne, F.R.S., completed his investigation of the beech (*Nothofagus*) forests, visiting, amongst others, those of Southland (including the area from Lake Manapouri to Doubtful Sound), of the Mamaku Plateau, and of the Urewera. Many details came to light concerning regeneration and the rate of growth of the different species, knowledge which is fundamental in regard to any methods of silviculture. Dr. Cockayne also went most carefully into the matter of classification of the species of *Nothofagus*, and it stood out clearly that the tree hitherto defined merely as a variety of the red-beech (*N. fusca*), called *Colensoi*, was not only a distinct species but a most important timber-tree with a range far wider than had been appreciated. For this species, now to be known as *Nothofagus truncata*, the name "hard-beech" is suggested. Dr. Cockayne has written a comprehensive report, largely of an economic nature, entitled "A Monograph on the Beech Forests of New Zealand," and this is now in the printer's hands. The monograph is illustrated with a large number of photographs, line drawings, and two maps, and it should bring clearly to the public a knowledge of the extreme value of the beech forests, while at the same time it should be of great value to forest officers, dealing, as it does, with the ecology of the forests, their silvicultural possibilities, and the classification and easy recognition of the species and their hybrids.

Tawa Forests.

On the conclusion of his investigation of the beech forests an arrangement was made with Dr. Cockayne to study the tawa (*Beilschmiedia tawa*) forests with special reference to those of the Rotorua region. This research he commenced in January, and from then to the beginning of March he visited various areas near Rotorua, examining the rate of growth of the tawa and the trees with which it has to compete, the various stages of regeneration, and other important matters. The research is still being prosecuted.

The Taxad Rain Forest of Westland.

Mr. C. E. Foweraker, M.A., F.L.S., Lecturer in Charge of the School of Forestry, Canterbury College, continued his investigations upon the "native pine" or taxad forests during the year. He extended his observations to the taxad forests in part of the North Island in order to make comparisons with Westland. His observations in the northern districts showed that the natural regeneration of the virgin taxad is very meagre compared with that in Westland. The taxads seem to be gradually replaced by various broad-leaved trees both in virgin and in logged areas. Firing of logged areas results in a complete lack of regeneration of useful trees. Observations were continued in Westland in areas where regeneration was most marked, and the regeneration of rimu among manuka-covered areas and the behaviour of young taxads in various types of stands was investigated. A first report will be completed during the current year.



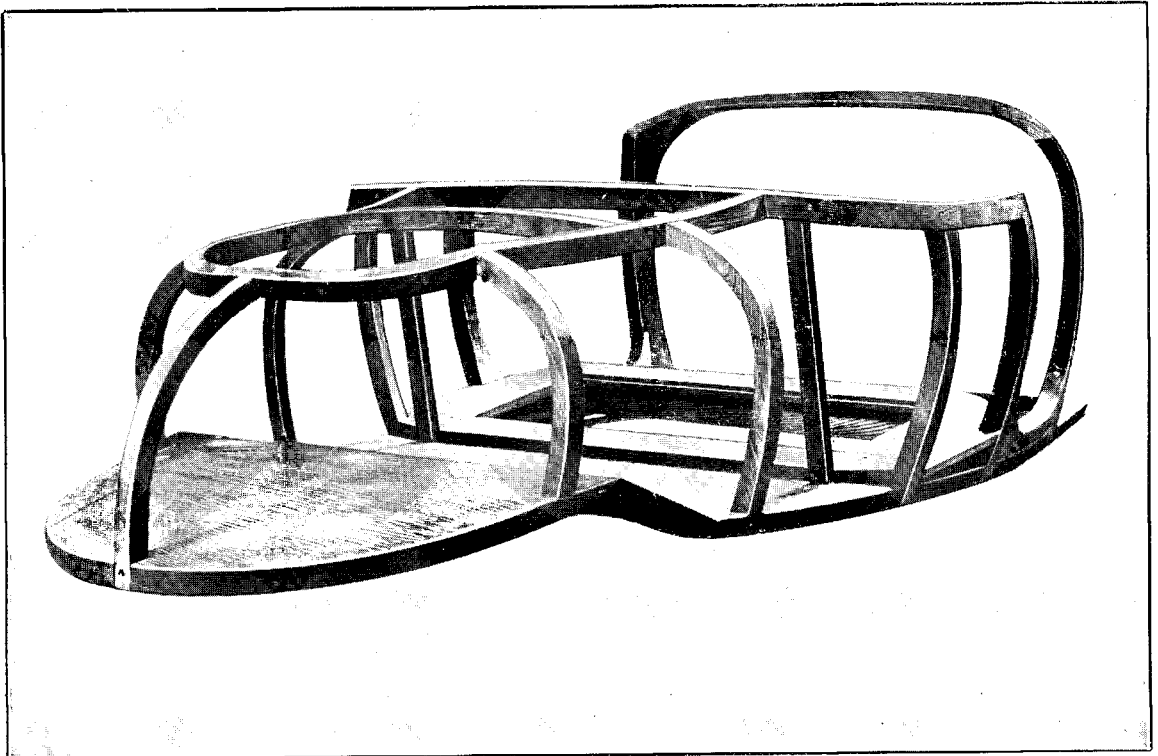
MOTOR-TRACTOR SUPPLANTS HORSES AND LOCOMOTIVES AND MINIMIZES FIRE DANGER.



MILLIONS OF TREES FOR FARMERS PRODUCED BY MODERN NURSERY PRACTICE AND PRESENT-DAY MACHINE METHODS BY STATE FOREST SERVICE.



FURNITURE MANUFACTURED FROM NEW ZEALAND BEECH TIMBER.



MOTOR-CAR BODY-FRAME MANUFACTURED FROM NEW ZEALAND BEECH TIMBER.

The Growth and Structure of New Zealand Taxads.

These studies were continued at Canterbury University College under the direction of Dr. Chilton. Germination studies of the main taxads are being carried out under various light, exposure, and moisture conditions, and in various media, such as sand, leaf-mould and sand, and acid soil from Westland. The nature of taxad growth-rings is being further studied, and, while no definite results are yet available, certain data point to the rings being yearly ones.

Kauri and Northern Forests.

This investigation has been continued by Mr. W. R. McGregor, B.Sc., of Auckland University College. In addition to observations regarding regeneration of kauri, measurements of the rate of growth, and records of meteorological and related phenomena, analysis of that important locality factor the soil has received particular attention during the past year. The first report will be issued during the current year.

SILVICULTURAL AND UTILIZATION INVESTIGATIONS.

Westland Forest Experiment Station.

The main operations during the past year were the experimental planting of 200 acres of cut-over bush land, felling of dead trees (preparatory to planting) on 230 acres of burnt-over land and the establishment of sample plots to ensure accurate and representative growth data of all species on trial. 127,000 trees were planted, of the following species: Insignis pine (*Pinus radiata*), Ponderosa pine (*P. ponderosa*), Douglas fir (*Pseudotsuga Douglasii*), *Thuja plicata*, *Populus nigra* var., and macrocarpa (*Cupressus macrocarpa*), and, on a smaller scale, *Eucalyptus Gunnii*, *E. viminalis*, *E. regnans*, *E. Macarthuri*, and *Pinus pinaster*. Of the species planted in 1923 *Thuja plicata* has been most successful, with a mortality of only 3 per cent., and poplar next with 4 per cent. *Pinus radiata* (mortality 36 per cent.) has proven a failure in swampy ground though successful in higher, gravelly sites, and *P. ponderosa*, which through the inclusion of large numbers of the highly unsuccessful variety *scopulorum*, shows a mortality of 22 per cent., has proved eminently successful as far as the species is concerned. The soil of this station, which consists mainly of cut-over rimu forest repeatedly subject to fires in recent years, is an acid, peaty layer of semi-decomposed humus over a layer of morainic, sandy gravel, underlain often at 2 ft. to 3 ft. by a hard-pan of ferruginous conglomerate.

Rangitikei Sand-dune Experiment Station.

Extremely favourable weather conditions aided progress during the year, when there were fewer frosts, fewer strong winds, and a much lighter rainfall than the average. The frequent formation of wind-channels in the foredune which has hitherto hampered progress is now being stopped by the burning of the drift-logs on the beach, as there is no doubt that masses of these logs were the cause of this trouble. Sand-shifting, due to strong winds coming at different periods from two different points, has been effectively met by means of two parallel scrub fences, 12 ft. apart, with connecting fences at 12 ft. intervals. Scrub fences still prove the most successful type. 207 acres were planted with marram-grass at a cost of £2 10s. 6d. per acre. The marram "nurseries" for providing planting stock from marram "sets" continue eminently successful, especially in positions where fed by drifting sand. Another 10 acres of marram nursery were formed during the year. Experiments in raising marram-grass, silvery sand-grass (*Spinifex hirsutus*), and sand-sedge (*Carex pumila*) from seed met respectively with poor, fair, and good results. Sixty-nine acres were planted with trees, and of the trees planted in previous years, insignis pine still proves the most suitable. Natural reproduction of native grasses and sedges since the area was fenced against stock is even more pronounced than a year ago. The headquarters of the station have been removed to a central site at Tangimoana, where a small forest nursery has been established.

Rate-of-growth Studies of Indigenous and Exotic Trees.

Growth-measurements were obtained on six permanent sample plots previously established, and nine new plots were instituted—five for kauri, two for beech, one for taxads, and one for exotic trees. Local yield-tables were prepared for redwood in the Waikato district and for insignis pine in Canterbury and in the Waikato district. Current annual growth-rates were ascertained for kauri, totara, rimu, matai, miro, silver-pine, kaikawaka; and field-work on the mean annual growth-rate of kauri, rimu, kahikatea, silver-pine, beech, was completed. These results will, combined with stand-table data to be obtained during the current year, afford in effect yield-tables for the most important of the indigenous and exotic timbers, enabling reliable forecasts of yield to be made and control cutting to be introduced throughout the State forests.

Mill-conversion Studies.

These studies were completed for rimu, matai, miro, totara, and kahikatea. The data was obtained in co-operation with representative sawmillers throughout the Dominion. These tables, to be published during the current year, should prove of great assistance to all those concerned with the estimation and appraisal of standing timber in the Dominion.

Log-scale Table.

The Forest Service Log-scale Table showing the volume of all sizes of logs in cubic feet was issued during the year and soon met with a ready demand from sawmillers.

Spark-nullifiers for Logging-locomotives.

After full investigation and trial of several designs the Service during the year decided upon a thoroughly efficient spark-arrester. This device while checking the emission of sparks also assists in keeping an even head of steam and in conserving fuel. Arrangements are being made for the application of this apparatus to logging-locomotives and other steam-engines and haulers operating in State forests.

Underplanting of Exotic Trees in the Indigenous Forests.

Observation of the sample plots at Mamaku show that Lawson cypress and *Thuja plicata* are the most promising species, the former having now for the most part topped the heavy growth of ferns. A third shade-tolerating species, *Abies pectinata*, is vigorous even in quite dense shade, but is of slow growth.

Tapping of Kauri for Kauri-resin.

This project, which is intimately connected with the silvicultural management of the kauri forests, was commenced on an experimental scale and will be continued for another two years.

AFFORESTATION STUDIES.

During the year detailed co-ordination studies were carried out at the four main forestation centres, and reports submitted dealing with technique, cost, and method of all operations in the nursery and in formation of plantations. A standard method of record-keeping and costing has been prepared for use throughout all the State forestation operations, and a co-ordinated system of experimental work has been established.

Tree-propagation and silvicultural-improvement investigations carried out during the year have given certain results which indicate a much increased efficiency in the methods adopted and show a substantial reduction in operative costs.

Nursery Procedure: Weed-eradication Experiments.

With the object of reducing the large annual costs expended on weeding nursery stock, investigations have been made in regional nurseries to test the efficacy of various mediums as weed-eradicators or weed-smotherers.

Experiments started last year with zinc sulphate applied to seed-beds as a weed-eradicator have been repeated, with negative results. The effect on growing stock of the four strength variants employed (1.25 per cent., 2.5 per cent., 5 per cent. solutions, and chemical applied dry) has been the same—viz., after germinating and growing for about two months, reaching a height growth up to $1\frac{1}{2}$ in., the roots of the seedlings have apparently been entirely destroyed by the chemical and the entire stock lost. The effect on weed-growth was total prohibition of germination.

Trials of sawdust laid down to a depth of about $\frac{1}{2}$ in. between seed-lines has proved most effective at the two stations where this was tried, and economical in cost. The application of this mulch has resulted in almost entire suppression of weed-growth and elimination of labour on weeding: a cost of approximately 7½d. per 1,000 plants for material and application, compared with 11d. per 1,000 for ordinary weeding.

Trials with oiled Kraft paper and Pabco-Thermogen paper mulch, applied between lines, were instituted rather late in the season, and preliminary results indicate the method is efficacious, but cost of application and material is high.

Experimental sterilization of the ground by burning with "Hauck" hand-burner was carried out at one station, with good results. This preliminary trial indicates that both in efficiency and cost this method promises well, the cost of trial weeding during one season showing 33 per cent. reduction on the treated plot.

Nursery-line Method of Tree-propagation.

Seed-sowing in open nursery lines was adopted this season at six stations with consequent reduction in sowing-costs. At Hanmer Springs the use of a Planet multiple seeder resulted in a reduction per pound of seed sown of 96 per cent. in the actual labour-cost of sowing operations.

The comparison of cost of raising two-year Corsican pine seedlings in the South Island in beds sheltered for the first season and in open lines shows that a labour-cost saving of 4s. 7d. per 1,000 plants may be effected by adoption of the open-line method.

Season of Sowing.

Sowings were carried out early in the season in several nurseries, and information gathered shows that in northern regions, at least, an earlier spring sowing season can be adopted for many species. Further experiments in autumn and periodical sowing with different species are being carried out; the present season being abnormally damp and cold, this year's results are not reliable on this point.

Plantation Procedure: Establishment by Direct Sowing.

During the year 177.9 acres were established in the North Island by sowing *in situ*, the crop being estimated at 124,600 trees, or approximately seven hundred per acre. Preliminary results are now available of experimental broadcast sowing on the lower foothills of North Canterbury. Half a pound of pondosa-pine seed was scattered promiscuously on patches of natural tussock grassland at varying elevations from 1,500 ft. to 2,000 ft. with south-east to east aspect, on shingly clay loam soil in a region of 36 in. average annual rainfall. The land was not fenced or protected from rabbits, and sheep have

browsed to some extent on the needles of the pines. Three years after sowing, the crop, when counted, produced 600 seedlings (from $\frac{1}{2}$ lb. seed) with height from 6 in. to 12 in.; the greater percentage of germination had taken place actually in the tussocks, but sufficient germination was also obtained on the clear, open space between grass tussocks.

Spot sowing of Douglas fir was made in the Auckland region on cleared kauri-forest land and resulted in appreciable germination.

Experimental Planting on Dredge Tailings.

At the request of the Hon. G. J. Anderson, Minister of Mines, the Service undertook the planting, as an experiment, of several exotic species on dredge tailings at Hokitika. Relative adaptability in the first year is shown in the following table:—

Species.				Survival Percentage.	Maximum Growth.	Mean Growth.
					In.	In.
Insignis pine	..	..	..	72	6	3
Pondosa pine	..	..	..	92	6.5	4
Douglas fir	..	..	..	80	8	3.4
<i>Thuja plicata</i>	..	..	..	92	6	4.1

The mortality over all species is 16 per cent.

Thinning Projects.

The work of thinning out the closely planted areas in the North and South Island stations was continued and expanded. Whakarewarewa Plantation thinning operations were carried out in blocks of *Eucalyptus Risdoni* and *E. amygdalina*, the yield being profitably disposed of for mine-props, poles, &c. Areas of insignis pine (twenty years old), and larch were given a trial thinning, the small-size material removed from the latter being used for camp firewood, while at Waiotapu 53 acres of pondosa pine were thinned, making a total area thinned to date equal to 435 acres larch and 65 acres pines.

At Dumgree Plantation, Nelson, Marlborough region, 2.55 acres of larch planted twenty years ago were thinned, giving 670 small-size poles per acre, which were sold locally for firewood. Ten acres of larch (nineteen years old) at Hanmer were thinned on contract, all trees above 3 in. diameter being marked by a State Forest Service officer. The smallest suppressed stems over this block found a city market as tomato-stakes.

FORESTRY IN THE PRIMARY SCHOOLS.

In co-operation with the Education Department a special campaign has been inaugurated during the year to stimulate the interest of teachers and school-children in the national problem of forest preservation and growth.

Widespread enthusiasm has been aroused in the subject, and 765 schools throughout the Dominion have formed school forest nurseries. The seed for raising exotic trees is supplied free by the Forest Service, the children carrying out the work as part of their practical instruction in agricultural science. In several regions agricultural show committees have willingly co-operated, and are offering forestry shields as trophies to be competed for in the forestry exhibit class of the schools section, while subsidiary prizes are also being offered by the State Forest Service and others. During the year a conference of School Agricultural Inspectors and Instructors met representatives of the State Forest Service and formulated a programme for stimulating interest throughout primary, secondary, and district high schools, and as a result the Education Department has indicated that forestry-teaching will be included as a subject in the school syllabus. The formation of school plantations is being kept in view where conditions are favourable, and a direct impetus to farm planting has been given in certain districts where surplus stock from the school nursery has been taken home and planted by the pupils. An effort is being made, with the help of the schools and forestry societies, to revive the observance of Arbor Day and Forest-protection Day throughout the country.

A special pamphlet, "Schools Forestry and Plantations," dealing with school nursery procedure and planting of school-grounds has been issued to all schools in the Dominion, and special articles on various aspects of Forestry are being supplied for publication in the *School Journal* and the Educational press.

2. FOREST PRODUCTS INVESTIGATIONS.

One of the most important factors responsible for swelling the drain on our forests to its present volume is the large amount of preventable waste so conspicuous at every stage of exploitation and manufacture. To the solution of the waste problem the energies of the Branch of Forest Products are directed. During the reporting period the scope of the work has been enlarged, its application increased, co-operative work with industrial interests extended, and new methods of disseminating results developed.

The greater part of the investigative work remains in the hands of co-operating institutions, notably the Engineering Schools attached to the Auckland and Canterbury University Colleges, where valuable work has been performed. The high labour turnover, the interrupted character of the work, and the supervision available necessitates, however, additions to the permanent staff if economy of effort and the highest efficiency are to be secured.

Signal progress has been achieved in the field of timber-testing. Red, black, and hard beech, kamahi, kauri, and insignis pine were investigated, and cross-arm tests of hinau and red-beech, and pole tests of silver-pine, kawaka, *Eucalyptus amygdalina*, and *E. ovata* were completed. A modern revolving-drum box-testing machine was designed and built for the study of dairy containers in which wire bindings and corrugated fibre packages promise to play an important part.

The proposed installation of an experimental dry kiln was delayed for the purpose of watching developments in connection with the commercial application of the internal fan type of kiln. This type has now proved so successful that a semi-commercial plant is now urgently needed for the establishment of drying schedules for the native woods. A study of the shrinkage in wood taking place during seasoning resulted in the development of a table of sawing excesses for the principal softwoods.

Continued attention was given to the study of wood-preservation problems. A comprehensive report upon the wooden-pole situation was prepared for publication and recommended methods for the open-tank treatment of the commonly grown exotic timbers disseminated through the *Journal of Agriculture*. Mr. D. Miller, B.Sc., Entomologist, Department of Agriculture, has prepared a valuable treatise on the forest and timber insects of the Dominion. This report is now in the hands of the Government Printer. Imported poles, piles, &c., continue to introduce forest and timber insects into New Zealand, and it has now been proven that the destructive Australian white ants can acclimatize themselves in this country. The necessary statutory machinery is now being formed to regulate further introductions of these and other pests. Mr. J. S. Yeates, Ph.D., of Victoria University College, continued his research into the sap-stains of white-pine and other timbers, and developed a method of control by dipping in a weak solution of borax.

The enormous possibilities attached to the chemical utilization of wood lead to the inauguration of a long series of destructive distillation and pulping investigations. A portable type of destructive distillation apparatus was used for a study of kauri waste, and a modern oil-bath heated retort purchased for intensive research in the same subject. Pulping tests of rimu and white-pine are being carried out in co-operation with the Commonwealth Bureau of Science and Industry, and deresinating and pulping tests of kauri in co-operation with the Imperial Institute, London. A preliminary study of the bleeding of kauri-trees was commenced.

The Dominion Building Conference, sponsored by the Forest Service and attended by forty-four delegates representing Government, local body, and consulting architects and engineers, builders, sawmillers, and other interests throughout the Dominion, marks a signal advance in one of the major lines of research. It is the policy of the Forest Service to study each wood-using industry for the purpose of indicating economies in the material used, and attention was first given to the building industry, since it consumes more than half of all the rough sawn timber used in the country. The Conference brought to the attention of the public as never before the necessity of eliminating waste in the utilization of timber. Prominent recognition was given to the importance of improving the technique of cutting, grading, and seasoning of timber, and of applying preservative treatment to eliminate the heavy drain upon the forest resources due to replacement of structures destroyed by insects and decay. The results secured will have far-reaching effects in preventing waste in the building industry.

CHAPTER V.—GENERAL.

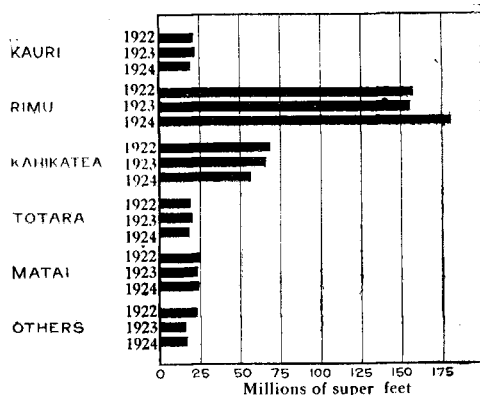
REPORT OF THE TIMBER TRADE FOR THE YEAR ENDED 31ST MARCH, 1925.

Production.

The following tables, showing the reported output in superficial feet of the various species of timber from New Zealand sawmills during the years ended 31st March, 1922, 1923, and 1924, have been compiled from figures supplied by the Government Statistician:—

REPORTED PRODUCTION OF SAWN TIMBER BY SPECIES.

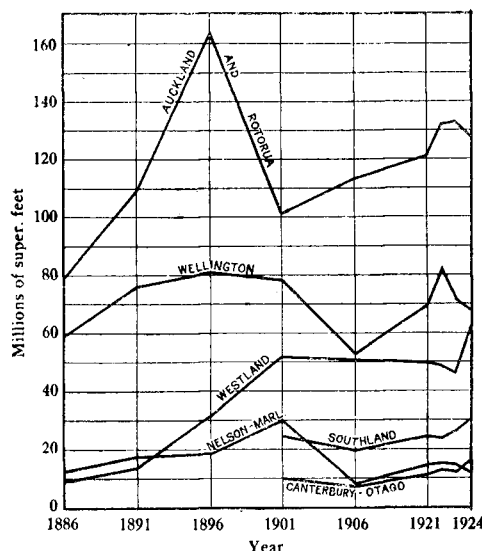
Species.	1922.		1923.		1924.	
	Sup. Ft.	Per Cent.	Sup. Ft.	Per Cent.	Sup. Ft.	Per Cent.
Kauri	21,435,728	6·81	22,460,759	7·38	19,743,196	6·23
Rimu	157,345,928	49·96	155,627,936	51·13	181,093,581	57·12
White-pine ..	68,486,633	21·74	66,088,219	21·72	56,699,443	17·88
Totara	19,570,561	6·21	20,843,718	6·85	18,904,361	5·96
Matai	24,830,368	7·88	23,747,049	7·80	24,326,148	7·67
Beech	4,863,184	1·55	5,227,018	1·72	6,528,981	2·06
Insignis pine ..	10,815,485	3·43	7,683,602	2·52	7,386,249	2·33
Other	7,624,423	2·42	2,673,576	0·88	2,387,257	0·75
	314,972,310	100·00	304,351,877	100·00	317,069,216	100·00



GRAPH SHOWING PRODUCTION OF ROUGH-SAWN TIMBER FOR THE YEARS ENDED 31ST MARCH, 1922, 1923, AND 1924.

Mills reporting to the Government Statistician cut approximately 317,000,000 superficial feet of rough-sawn timber during the year ended 31st March, 1924, representing an increase of 4·2 per cent. over the reported production for the previous period, and an increase of 0·7 per cent. over the previous peak production of 1922. The total production from all sources for the year ended 31st March, 1924, is estimated at 330,000,000 superficial feet, as predicted in the last annual report. (The total production for the year ended 31st March, 1925, will be approximately the same as that of the period under review.)

A graph has been prepared from the figures supplied by the Government Statistician to show the trend of regional timber-production for the period 1895 to 1923. The statistics are compiled for provincial districts which correspond closely to forest-conservation regions. Although Auckland and Rotorua regions combined, together with Gisborne (*i.e.*, Auckland Province), maintain the premier position, their total cut was slightly reduced. The increased production on the Mamaku Plateau, where several large companies have recently commenced operations, has tended to balance the reduced cutting in the North Auckland district. Wellington still ranks as second on the list, but is expected to give place to Westland in the year ended 31st March, 1925. This trend reflects the exhaustion of the more accessible forests of the Main Trunk district in the North Island, and the opening-up of wider domestic markets for Westland.



GRAPH SHOWING THE PRODUCTION OF SAWN TIMBER IN THE VARIOUS CONSERVATION REGIONS FOR THE PERIOD 1886 TO 31ST MARCH, 1924.

The average f.o.r. mill value (all species) for the year ended 31st March, 1924, remained at 20s. per 100 superficial feet, as for the previous period. As Westland develops its mill-to-consumer trade this value will tend to increase. This system of marketing, which has been such a prominent feature of the North Island timber trade for several years, undoubtedly returns higher yields to the producer, but tends to eliminate the timber-merchant, who has hitherto rendered a valuable service to the community in closely grading and seasoning timber. Unless these responsibilities are assumed by the miller the consumer will not stand to gain by the extension of this trading practice.

Export.

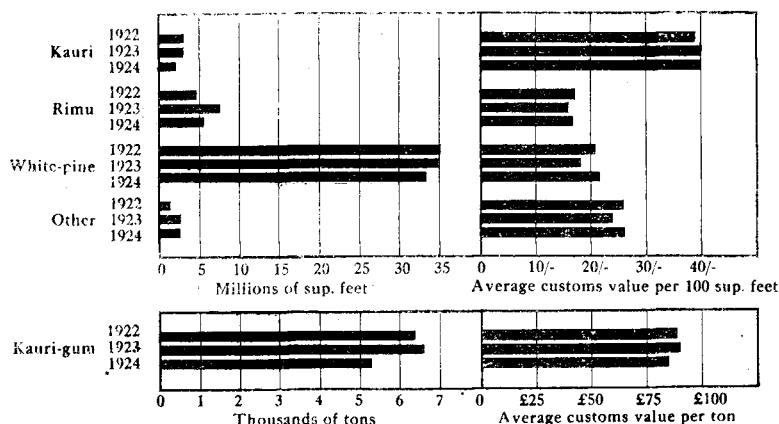
(For Customs returns see Annexure V, page 32.)

A total of 43,323,049 superficial feet of timber, valued at £477,944, was exported during the year ended 31st December, 1924, compared with 48,093,506 superficial feet, valued at £471,805, exported

during the preceding year. This represents a decrease in quantity of 9.9 per cent., but an increase in value of 2s. 6d. per 100 superficial feet. The average Customs export value for the period under review was 22s. 1d. per 100 superficial feet.

Despite serious competition by Pacific coast and Baltic timbers white-pine continued in favour on the Australian markets, 33,375,876 superficial feet being disposed of to the Commonwealth at an average Customs export value of 21s. 7d. per 100 superficial feet, representing an increase in value of 3s. 3d. per 100 superficial feet over the previous year.

Kauri-gum exports fell from 6,598 tons in 1923 to 5,261 tons during 1924, and the average Customs export per ton from £90 7s. 3d. to £84 6s. 3d. over the same period.



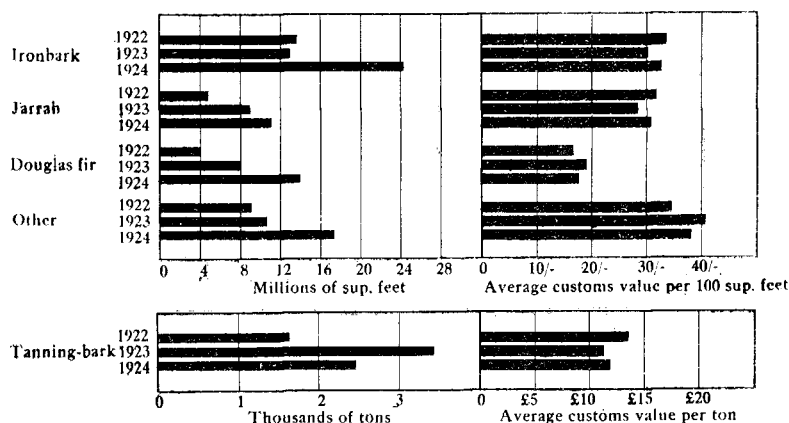
(GRAPH SHOWING EXPORTS FOR YEARS ENDED 31ST DECEMBER, 1922-24.)

Import.

(For Customs returns see Annexure V, page 32.)

A total of 66,585,051* superficial feet timber, valued at £1,019,288,* equal to 30s. 7d. per 100 superficial feet, was imported during the year ended 31st December, 1924, compared with only 40,319,363* superficial feet, valued at £611,233,* equal to 30s. 4d. per 100 superficial feet, imported during the previous year.

The large imports of ironbark, jarrah, and other Australian hardwoods reflect the constructional activities of the Public Works Department, the Electric-power Boards, and other authorities. Douglas fir (Oregon pine) continued to grow in popular favour, the imports for the period under review amounting to 14,000,000 superficial feet, compared with 8,000,000 superficial feet during 1923, and with only 4,000,000 superficial feet during 1922. The average Customs import values for the years ended 31st December, 1924, 1923, and 1922, were 17s. 10d., 19s. 2d., and 16s. 10d. respectively. Western red "cedar" (*Thuja plicata*) from the Pacific coast appeared for the first time in substantial quantities on the New Zealand markets, 1½ million superficial feet being imported, chiefly for house-building purposes in the Auckland and southern districts. A large number of dairy and fruit containers, principally of spruce timber, were imported from North America and Scandinavian countries. The imported wood has not that freedom from taint which makes New Zealand white-pine the best butter-box timber in the world. Recent reports from London view with grave concern the tainting of butter shipped in these containers.



(GRAPH SHOWING IMPORTS FOR YEARS ENDED 31ST DECEMBER, 1922-24.)

THE FOREST ATLAS.

Good progress has been made in the building-up of the permanent Forest Atlas. Thirty-three maps were compiled for the year, twenty-nine of which were certified by the Surveyor-General as required by section 25 of the Forests Act, 1921-22. An investigation was made into the boundaries

* Exclusive of laths, rails, palings, &c.

of State plantations, and maps have been compiled of the following: Puhipuhi, Whakarewarewa, Waiotapu, Kaingaroa, Hanmer, Balmoral, Naseby, Greenvale, and Dusky Hill. These cannot be completed until the status of the land has been cleared up. This is being proceeded with, and representations have been made to the Lands Department, whose assistance has been invaluable in the compilation of the maps, and it is anticipated that finality will be reached during the coming year.

Two wall index maps were completed, and form a very valuable addition to the equipment of the draughting-room.

LITHOGRAPHS.

The Surveyor-General signified his approval of the utilization of the maps of the Lands Department in compiling the original maps for use in the preparation of Forest Atlas lithographs. Atlas sheet No. 062 was reprinted, and 200 copies were received. Eight new Atlas sheets were lithographed, and 150 copies of each were received, and supplies forwarded for use in the District Offices.

PHOTOGRAPHIC RECORDS.

The total number of negatives now on record is 2,295. A total of 2,716 prints and 137 lantern-slides were prepared during the year.

WORK ACCOMPLISHED.

Tracings prepared ..	.. 263	Lithos and white prints	
Miscellaneous drawings ..	.. 85	amended and coloured ..	183
Graphs ..	.. 337	White and blue prints ..	584
Plans drawn on licenses ..	.. 47	Atlas sheets renewed ..	17
Maps mounted ..	.. 187		

Two wall-maps and five pictorial diagrams and graphs were prepared for exhibition and lecture purposes.

EDUCATIONAL PUBLICATIONS, ETC., PRINTED AND DISTRIBUTED.

- 1,000 copies of the Forest Service Log-scale.
- 1,500 copies Volume Tables for Rimu.
- 1,000 copies Annual Report, C. 3.
- 1,000 copies Professional Paper No. 1: "Some New Zealand Woods."
- 500 copies Circular No. 14: "Proceedings of Building Conference."
- 200 copies Circular No. 15: "Butter-boxes and their Design."
- 5,000 copies Circular No. 16: "Schools Forestry and Plantations."
- 1,000 copies Circular No. 17: "The Growing of Eucalypts."
- 500 copies Circular No. 18: "Sap-stain in Timber of *Pinus radiata*."
- 2,000 leaflets: "Eucalypts: Tray Method of raising Seedlings."
- 40,000 leaflets: "Advice and Assistance to Tree-planters."
- 17,000 copies "Tree-planters' Guide."
- 15,000 copies: North Island Price-lists.
- 8,000 copies: South Island Price-lists.
- 3,000 posters advertising trees for sale were distributed throughout post-offices and District Offices.
- 30 books: "Fire Reports."
- 1,000 forms: "Permit to burn."
- 2,000 forms: Fy.-E. 18.
- 200 forms: Fy.-K. 6.
- 200 forms: Fy.-K. 7.
- 1,800 calico "Fire Notices."
- 2,000 picture advice-cards.
- 6,024 calendar folders.

FOREST SERVICE LIBRARY.

During the year substantial advance has been made in the classification of books and pamphlets to date, and the formulation of a card catalogue system, and a general catalogue will be issued during the current year, which will be supplemented periodically. A total of 778 books, pamphlets, and reports, including the collection of forestry works formerly belonging to the late Sir David Hutchins, have been added, making a total of 2,954 works in the library. The library has proved most useful during the year for reference work, and 2,847 books, magazines, &c., have been issued for circulation. Books have been issued on loan to field officers to supplement the regional libraries, and the library at Central Office is open to the public for reference work.

ANNEXURES.

ANNEXURE I.—STATE AND PROVISIONAL STATE FORESTS AND FOREST RESERVES.
AREA IN ACRES AT END OF FISCAL YEAR 1925.

Land District.	Area in Acres at End of Fiscal Year 1924.			Changes in Area during the Fiscal Year 1924-25: Net Increase in Acres.			Area in Acres at End of Fiscal Year 1925.			Percentage of Area of Land District in Permanent and Provisional State Forests and Forest Reserves.
	State Forest.	Provisional State Forest.	Forest Reserves.	State Forest.	Provisional State Forest.	Forest Reserves.	State Forest.	Provisional State Forest.	Forest Reserves.	
N. Auckland..	104,809	44,032	..	892	13,740	..	105,701	57,772	..	3.6
Auckland ..	151,228	625,768	2,316	72,982	154,765*	..	224,210	471,003	2,316	8.5
Gisborne† ..	..	..	..	87,696†	208,609†	11,160†	87,696	208,609	11,160	8.7
Hawke's Bay	200,824	53,735	16,414	87,696*	52,235*	11,160*	113,128	1,500	5,254	4.1
Taranaki ..	69,500	43,026	40,594	3	171	..	69,503	43,197	40,594	6.3
Wellington ..	456,671	144,808	14,105	1	536†	98†	456,672	144,272	14,007	8.7
Nelson ..	19,955	1,988,478	8,470	759†	55,497†	..	19,196	1,932,981	8,470	41.6
Marlborough..	89,497	120,625	12,062	..	..	..	89,497	120,625	12,062	8.0
Westland ..	2,187	1,714,022	119	3	2,238†	..	2,190	1,711,784	119	44.4
Canterbury ..	310,717	..	319	9,304	..	..	320,021	..	319	3.4
Otago ..	133,107	334,012	2,108	..	1,111	..	133,107	335,123	2,108	5.1
Southland ..	136,349	593,324	..	1,243	10,478	..	137,592	603,802	..	9.4
Totals ..	1,674,844	5,661,830	96,507	83,669	31,162†	98†	1,758,513	5,630,668	96,409	..

* Net decrease due mainly to allocation to Gisborne Land District. † Not included in previous reports. ‡ Net decrease.

Permanent and provisional State forests and forest reserves under Service control comprise 11.3 per cent. of the total area of the Dominion. Total area of State forest and provisional State forest and forest reserves at 31st March, 1925, 7,485,590 acres.

ANNEXURE II.—SUMMARIZED REPORT UPON STATE FORESTATION OPERATIONS IN THE NORTH ISLAND.

(By H. A. GOUDIE, Conservator of Forests, Rotorua Conservation Region.)

EXTENSION OF PLANTATIONS.

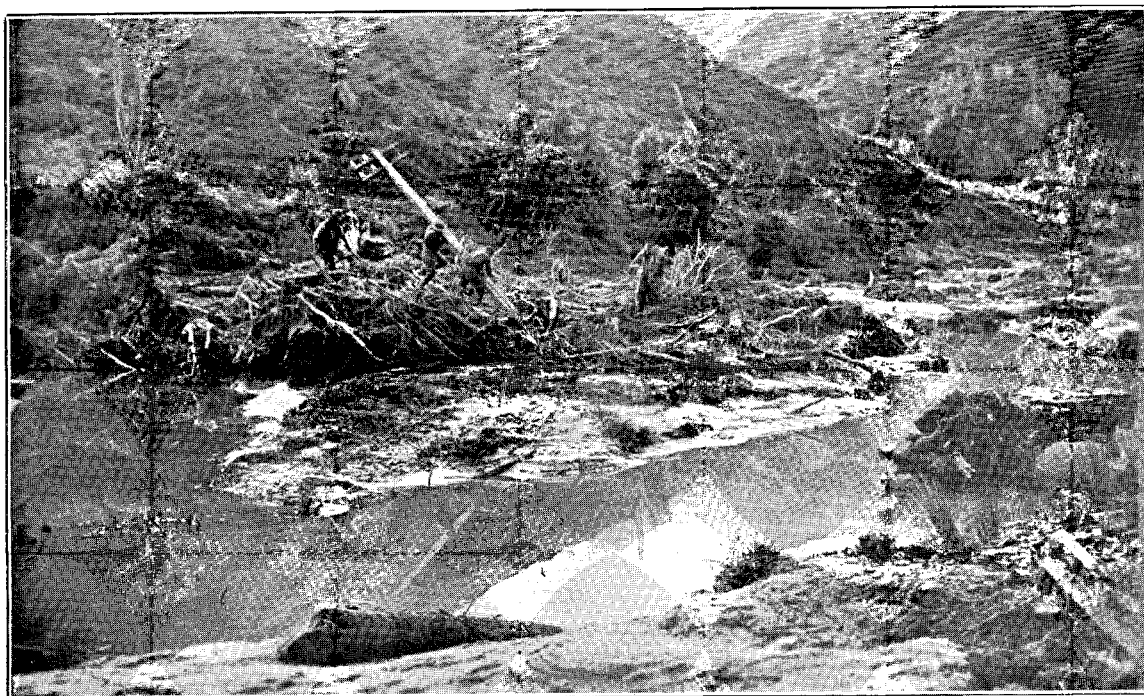
The extension work during the year on the Kaingaroa Plains was most satisfactory, an area of 8,434 acres being planted with 5,504,070 trees. The principal species used were pondosa pine, Corsican pine, insignis pine, and Douglas fir, while some twenty-nine thousand eucalypts were planted experimentally. Notch planting was again used, and the results have been entirely satisfactory. The labour-cost was only 8s. 11d. per acre, and the total cost, including trees, £1 8s. 11d. per acre. The death-rate averaged about 8 per cent. Splendid growth has been made by all species planted.

A trial planting was made over a 300-acre block with some two hundred thousand seedling Douglas fir, and the results to date are very satisfactory, the death-rate being only 5 per cent. The use of seedling trees means a very considerable saving in cost.

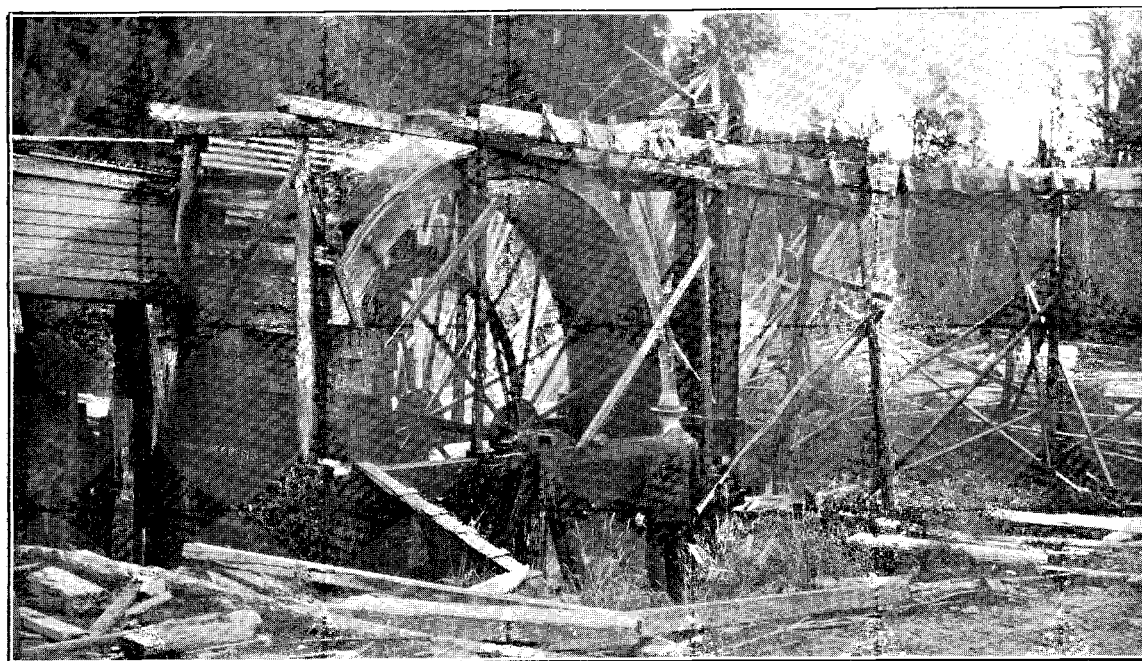
DIRECT-SOWING EXPERIMENT.

Young trees are making good growth and the position, as disclosed by a count made in December, 1924, is as follows :—

Species.	Date sown.	Amount of Seed per Acre.	Total Seed used.	Area covered.	Number of Trees per Acre, 10/3/24.	Number of Trees per Acre, 31/12/24.
		Lb.	Lb.	Acres.		
Douglas fir ..	November, 1923..	3	27	36	907	1,960
Insignis pine ..		3	52½	70	513	970
Pondosa pine ..		1	63	63	169	750



FLOOD DAMAGE, TARANAKI DISTRICT: DESTRUCTION FOLLOWS DENUDATION OF FORESTS ON STEEP HILLSIDES.



OVERSHOT WATER-WHEEL DRIVING BUSH SAWMILL,¹ SOUTH WESTLAND.



RECEIVED BY THE FBI ON 11/11/61

TREE-GROWING.

A very good crop all round has been secured. The softwood trees and eucalypts generally are well up to standard. The total quantity of seed sown was 1,423 lb., with an estimated crop of 9,000,000 plants.

Open-bed sowing without shade or covering was tried at Rotorua and Kaingaroa with good results. The season was wet and thus favourable to this method, but further trials will be made. A fine crop of pondosa pine (*Pinus ponderosa*) has been secured this year, and present appearances indicate that the crop is of the true type. A trial planting with seedlings from this crop will be made early in the coming planting season, as many of them are large enough for successful permanent planting now.

UNDERPLANTING.

Some four hundred redwood plants were used in underplanting larch on Whakarewarewa Plantation with good results. It is proposed to use about ten thousand for the same purpose during the coming season.

THINNING.

Whakarewarewa Plantation.—Approximately 16 acres of *Eucalyptus Risdoni* were thinned under permit. The demand for milling-timber determined the rate of thinning, as there was practically no demand for the material fit for firewood only.

General.—Thinning is undoubtedly urgently required at Whakarewarewa and Waiotapu Plantations.

DEER IN PLANTATIONS.

This pest continues to make itself felt in spite of fairly consistent shooting. For the first time on record these animals invaded the Rotorua Nursery, and it was very fortunate that serious damage was not done to the young plants in the seed-beds. Seven head were located and destroyed. During the year a total of fifty-one were shot, at a cost to the Service of £11 1s. 4d. About twelve miles of access tracks were opened, to allow of free movement through the worst-infested areas, at a cost of £116. Arrangements have now been made for three good shots to spend a week or two in the plantation during the shooting season, and our own employees will also continue to destroy as many as possible.

FIRE PROTECTION.

Owing to the wet state of the weather during the summer the danger from fire was less than usual. Patrolmen and lookout men were engaged as previously, and fire-breaks maintenance and extension attended to. The costs at the various stations were as follows :—

Plantation.	Area. Acres.	Cost per Acre. s. d.
Whakarewarewa	8,037	5 2
Waiotapu	7,010	3 0
Kaingaroa West	11,615	2 3
Kaingaroa Plains	17,588	2 3
Total	44,250	Average 2 7½

The question of internal fire-breaks is now being seriously reviewed, and a definite policy regarding same will shortly be formulated. Owing to the large area which is rapidly accumulating the problem is one of considerable importance.

MAINTENANCE.

Clearing round trees, repairs to fences, buildings, &c., were fully maintained, and the costs work out as follows :—

Plantation.	Area. Acres.	Cost per Acre. s. d.
Whakarewarewa	8,037	3 6
Waiotapu	7,010	4 2
Kaingaroa West	11,615	2 0
Kaingaroa Plains	17,588	1 5
Total	44,250	Average 2 4½

EQUIPMENT.

In pursuance of the policy to motorize the transport service as far as possible, sixteen horses were sold, and two Ford 2-ton trucks and two Fordson tractors were purchased. Generally speaking, it can be stated the motorization is a movement in the right direction.

During the year three Hauck burners were purchased, and these have proved most useful in burning rubbish and weed-growth on difficult places on the fire-breaks. The first cost is somewhat high, but providing the life is fairly long this is a very valuable piece of equipment.

BUILDINGS.

At Rotorua and Kaingaroa buildings were altered at small cost to accommodate the motor trucks and tractors.

At Kaingaroa West a station was erected for the forest ranger in charge, and tenders have been called for by the Public Works Department for the erection of a similar type of cottage for the forest ranger in charge of Whakarewarewa Plantation.

ARBORETUM.

An area of 50 acres, lying to the north of and adjoining Rotorua Nursery, was allocated for this work. Fence-posts comprising some fifty species of native and exotic timbers are now coming to hand. These will be treated with preservatives and used for fencing in the area and at the same time will provide a useful test of the various timbers. During the coming spring the new area will be worked up and sown down in grass.

SALE OF TREES AND SEEDS.

Analysis shows a great increase in the business done, and a bigger ratio of increment than has been recorded in any previous season, amounting to 64 per cent. All classes of trees were in demand, and stocks set aside for sale were sold out. Sales to private and public planting companies increased from 237,685 in 1923-24 to 854,000 in 1924-25, whilst the increase to farmers was from 601,070 to 951,685 in the same period. Conifers, &c., sold numbered 1,706,843, and eucalypts 587,089—a total of 2,293,932 trees, which planted at 8 ft. apart represent 3,373 acres. The concession made in payment of freight was much appreciated, as is evidenced by the increase in the number of orders (1,245 to 1,610) and the increase in number of trees per order (1,120 to 1,424). A large amount of correspondence was received and dealt with. Stock sold has given great satisfaction. Exceptionally low death-rates have been the rule, and consignments have been received in good condition. Many complimentary letters testify to the popularity and efficiency of the Service, and a continuance of increased business may confidently be expected.

<i>Summary :—</i>					1922.	1923.	1924.
Trees sold	..	..	..	..	1,105,164	1,399,334	2,293,932
Conifers planted	..	..	1,706,843	At 8 ft. apart	..	..	2,510 acres.
Eucalypti planted	..	..	587,089	„	..	..	863 „
			2,293,932				3,373

<i>Trees sold :—</i>				1922.	1923.	1924.
To Farmers and others	..	..	..	801,398	838,755	1,805,648
To public bodies	..	..	..	184,130	363,575	316,935
To other Departments	..	..	..	20,033	103,276	162,062
To soldier settlers	..	..	..	..	88,517	..
To schools and colleges	..	..	..	9,603	5,211	9,287
				1,015,164	1,399,334	2,293,932

REVENUE.

Following are particulars of revenue from nursery and plantations received during the last three years :—

				1924-25.			1923-24.			1922-23.		
				£	s.	d.	£	s.	d.	£	s.	d.
Sale of trees	..	..	..	6,882	3	5	4,074	12	9	3,121	7	7
Sales of tree-seeds	..	..	..	906	19	11	546	1	6	574	16	2
Sales of firewood	..	..	..	7	13	11	47	13	11	2	0	0
Sales of posts, &c.	..	..	..	63	8	5	72	10	11	..		
Grazing	..	..	..	228	9	0	222	13	10	207	15	9
Rental of departmental cottages			..	373	11	3	334	16	3	374	8	9
Inspections and reports	..	..	..	..			51	19	6	..		
Sundries	..	..	..	238	9	6	184	12	9	130	11	4
				£8,700	15	5	£5,535	1	5	£4,410	19	7

PROPOSALS, 1925-26.

Produce 10,000,000 trees.

Plant 8,500,000 trees on 12,500 acres new area.

Sell 3,000,000 trees to public.

Establish arboretum (commencement work).

Erect two ranger stations.

Maintain and protect 44,000 acres established plantations.

ANNEXURE III.—SUMMARIZED REPORT UPON STATE FORESTATION OPERATIONS IN THE SOUTH ISLAND.

(By W. T. MORRISON, Conservator of Forests, Canterbury-Otago Region.)

EXTENSION OF PLANTATIONS.

Operations at the various plantations have been successful, and a record new area was planted, a total of 2,192 acres being established.

Generally speaking, very good survivals have been obtained. At Greenvale 600 acres were established with a loss of only 4 per cent. over all, while the same applies to Naseby. In the majority of cases two-year seedlings were used, and it is evident that greater success attends the planting of this stock than was the case with older lined-out stock used in previous years. The former appear to be more vigorous and quicker to strike off than three-year lined-out stock, and the percentage of deaths is less.

The actual labour-costs of planting per acre are as follows—these are merely the actual wages covering planting, cartage, heeling in, and distribution :—

					£	s.	d.	
Greenvale Plantation	..	..	..	..	..	1	2	4 per acre.
Naseby Plantation	..	..	..	..	..	0	18	1 „
Balmoral Plantation	..	..	..	..	..	1	8	1 „
Hanmer Springs Plantation	..	..	..	..	..	1	1	9 „

The general development of the established plantations has been excellent, and at both Naseby and Hanmer Springs the wet season has induced almost abnormal growth.

TREE-GROWING.

A very successful year may be recorded as far as our operations are concerned in the South Island nurseries. Considerable advance was made with the line-sowing operations, and it appears that the preliminary work carried out in this direction can be substantiated by results obtained on a much larger scale and which prove that the theory of mass production by cheap and simple methods is sound. The total number of seedlings raised by this method during the year at the three stations totals 3,314,000 trees. Of this number, 2,349,000 are insignis pine, while the remainder are of various species, such as pondosa pine, Corsican pine, and Douglas fir.

The actual cost per thousand to date, including all principal charges, shows a very considerably reduced production figure as compared with the old methods. At Tapanui Nursery one-year trees cost from 5s. 8d. per 1,000 (main nursery) to 8s. 2d. per 1,000 (extension nursery).

For the purposes of comparison I give here the production-cost figures for previous years on the old system of sowing and lining out at Tapanui based on age-classes. This is, of course, an all-in cost, and includes all species of trees.

Season.	First Year.	Second Year.	Third Year.
	£ s. d.	£ s. d.	£ s. d.
1921-22	2 5 2	4 12 5	6 18 5
1922-23	1 17 10	3 15 8	5 13 6
1923-24	1 19 9	3 19 6	5 19 3
1924-25	1 9 8*	2 19 4	4 9 0

* Approximate only.

At Hanmer Springs nursery the line sowing has met with equal success, and costs show a very marked reduction. Accurate figures have been kept in regard to a block of 2,500,000 Corsican pine which were sown in 1922-23, and I give here the cost in connection with these in which all amounts chargeable have been covered, including supervision, proportional depreciation on departmental property, and interest, &c. The total cost of the trees per 1,000 to date of transfer to permanent quarters in plantation is 5s. 9½d. per 1,000. To have raised this number by the old treatment a charge would have to be included for lining-out of at least £750, for scrim covering approximately £100, frames £60, lifting and sizing £120. The actual saving represented, therefore, amounts to over £1,000, while the final output of trees would have been very much reduced by losses through lining-out. For the purpose of comparison, previous “all-in” costs at Hanmer Springs are as follows :—

Season.	First Year.	Second Year.	Third Year.
	£ s. d.	£ s. d.	£ s. d.
1921-22	2 9 0	4 18 2	7 7 6
1922-23	1 17 10	3 15 8	5 13 6
1923-24	1 2 1	2 4 2	3 6 3
1924-25	0 16 8*	1 13 4	2 10 0

* Approximate.

It will be noticed that the price has been steadily reduced since 1921, and this is mainly accounted for by the adoption of line sowing, discarding scrim covering, less elaborate methods of seed-bed treatment, and elimination of lining-out.

Naseby Nursery also had a very successful year. There has been a very great improvement effected in the nursery generally, and tree-raising there will be more consistent than in the past. The actual labour-cost of raising 520,000 seedlings was 4s. 7d. per 1,000. With all supervision, &c., included, the total cost will not exceed 5s. per 1,000. Considering that the nursery is over 2,000 ft. above sea-level and climatic conditions unusually severe, it says much for the line-sowing system. The ranger in charge, in commenting on the system, states that the seed sown under frame conditions germinated rather more rapidly than the drill-sown seed, and in height growth during the first three months had the advantage. Subsequently, however, the drill-sown trees have surpassed the former in both height and growth, and general development. Weed-growth was also more easily controlled in the drill system. It may be stated here that for the purpose of ascertaining whether there was any permanent beneficial effect from protective covering the scrim was allowed to remain on a section of the seed-beds. The result was that, although the seedlings were certainly taller than those from which covering had been removed, a few months afterwards no difference can be detected.

The total estimated number of trees available for transfer from all stations is 5,271,750. Of this number, 725,000 are two-year insignis pine available for transfer to farmers and outside sources.

TREE-NURSERY STUDIES.

In connection with the cost of production it is interesting to note that approximately half the cost is accounted for by weeding, and several experiments have been carried out in order to test the most effective and cheapest method of dealing with the matter. The experiments were as follows:—

First Method: Covering the soil between lines with a mulch of sawdust to a depth of about $\frac{1}{2}$ in. This proved a very efficacious and cheap method, which resulted in almost complete suppression of weeds without any detrimental effect upon tree-development.

Second Method: Application of Thermogen paper. The papers for this experiment arrived too late in the season to thoroughly test the method. The study is being continued.

Third Method: Sterilization of the ground by burning. This was done with the Hauck burner on a small scale, and the results are very satisfactory. The cost per acre works out at £16 1s. This, on the basis of 500,000 trees per acre, would cost 7 $\frac{3}{4}$ d. per 1,000. In addition to the above cost, there was a proportion of weeding also, and this cost 10s. per acre, or less than $\frac{1}{4}$ d. per 1,000 trees. The total cost of applying this method would be approximately 8d. per 1,000.

Of the trials so far tried this appeals to me as the most logical, and it is certainly the cheapest.

FOREST-PROTECTION.

There is apparently no disease of a serious nature with the exception of the spruce-aphis, which has for the past few years taken annual toll of the Piceas and Abies. Luckily, the area of these species is small.

The usual fire-protective measures have been observed, and it is satisfactory to report that no fires of any sort have occurred. The fire-districts system seems to be operating well, and there has been no breach of the regulations regarding these, and the adjoining settlers have willingly co-operated with the officers in charge at the various stations.

REVENUE.

	1924-25.			1923-24.			1922-23.		
	£	s.	d.	£	s.	d.	£	s.	d.
Sale of trees	1,822	3	6	1,893	18	8	1,759	9	6
Sale of tree-seeds	63	3	0	82	11	0	55	19	10
Sale of firewood	73	6	3	89	12	6	75	2	6
Sale of posts, &c.	5	2	0	5	18	6	6	18	8
Grazing	202	11	6	235	8	11	41	10	0
Rental of departmental cottages ..	282	17	3	297	2	1	761	13	10
Sheep and wool	14	10	0	53	12	5	217	16	10
Miscellaneous	39	7	10	25	0	0	29	0	1
	£2,503	1	4	£2,683	4	1	£3,759	9	6

PROPOSALS FOR 1925-26.

During the coming year it is proposed to increase planting operations, and, in the aggregate, allowance has been made for the planting of 5,000 acres of new area. The distribution over the various plantations is as follows:—

Greenvale forest plantations	300	acres.
Blue Mountain forest plantations	1,100	„
Naseby forest plantations	100	„
Hanmer Springs forest plantations	1,500	„
Balmoral forest plantations	2,000	„
Total	5,000	„

The 300 acres of planting at Greenvale practically completes the plantable area available, and the main operations will then be transferred to the Blue Mountain area, where it is hoped that ultimately some 18,000 acres will be available for planting. An area of 1,100 acres of this has been resumed in the meantime, and operations will be immediately commenced there.

It will be necessary also in the near future to acquire other areas of suitable extent in the Canterbury Land District, and a report has already been furnished regarding probable planting-sites.

ANNEXURE IV.—SUMMARIES.

SUMMARY OF OPERATIONS IN NURSERIES DURING THE YEAR ENDED 31ST MARCH, 1925.

Name of Nursery.	Total Expenditure.				Trees in Nurseries.			
	Tree-growing.	Maintenance.	Buildings, &c.	Total.	Estimated Trees raised during Year.	Output of Trees.		Estimated Number in Nurseries at 31st March, 1925.
						Trees sent to Plantations during Year.	Trees sent to Outside Places during Year.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.				
Rotorua ..	9,334 10 11	101 18 10	743 18 0	10,180 7 9	9,091,300	5,604,470	2,293,932	11,431,000
Tapanui ..	1,785 12 2	1,791 10 10	187 7 2	3,764 10 2	2,037,900	483,350	448,651	4,407,300
Hanmer Springs ..	1,571 10 8	1,611 11 5	1,122 7 5	4,305 9 6	2,369,230	1,029,200	402,416	7,453,783
Naseby ..	400 8 3	210 11 1	57 3 7	668 2 11	520,000	70,815	64,565	839,200
	13,092 2 0	3,715 12 2	2,110 16 2	18,918 10 4	14,018,430	7,187,835	3,109,564	24,141,283

SUMMARY OF OPERATIONS IN PLANTATIONS DURING YEAR ENDED 31ST MARCH, 1925.

Name of Plantation.	Trees.			Total Expenditure for Year, including Cost of Trees from Nurseries.	New Area planted.
	Number received from Nursery.	Number used to replace Losses.	Number planted on New Area.		
				£ s. d.	Acres.
Whakarewarewa	400	400	..	3,585 16 3	..
Kaingaroa Plantation	5,628,670	..	5,628,670	19,893 18 6	8,612
Puhipuhi	..	..	..	499 3 0	..
Conical Hills	600	600	..	1,269 15 6	..
Pukerau	8,300	8,300	..	460 18 0	..
Dusky Hill	..	..	..	498 19 1	..
Greenvale	474,450	66,400	408,050	4,782 6 0	600
Naseby	70,815	..	70,815	1,449 18 1	79
Hanmer Springs	521,150	36,325	484,825	6,518 14 6	821
Balmoral	508,050	36,200	471,850	4,251 12 7	692
Raincliff	..	..	..	20 1 0	..
Waitahuna	..	..	..	11 0 0	..
Dumgree	32,500	..	32,500	573 19 1	48
Westland	130,200	..	130,200	1,912 18 0	200
Tangimoana	47,000	..	47,000	206 19 11	68
	5,422,135	148,225	7,273,910	45,943 19 6	11,120

SUMMARY OF OPERATIONS IN NURSERIES FROM 1896 TO 1925.

Name of Nursery.	Total Expenditure.				Trees in Nurseries.		
	Tree-growing.	Maintenance.	Buildings, &c.	Total.	Estimated Number of Trees raised during Period.	Output of Trees.	
						To Plantations.	To Outside Places.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.			
Rotorua ..	102,128 8 0	9,389 9 2	15,053 1 11	126,570 19 1	97,540,561	78,362,649	7,746,912
Tapanui ..	41,842 17 0	15,380 4 2	7,782 13 8	65,005 14 10	25,184,989	18,318,893	2,458,796
Hanmer Springs ..	24,714 19 6	9,424 18 3	6,223 1 11	40,362 19 8	22,874,356	13,822,095	1,598,478
Naseby ..	1,198 7 3	285 7 9	57 3 7	1,540 18 7	1,234,280	306,315	88,765
Ranfurly* ..	18,425 16 3	4,236 18 2	4,552 16 1	27,215 10 6	7,280,501	6,465,593	509,858
Starborough* ..	6,399 9 10	..	2,856 17 3	9,256 7 1	3,059,610	1,965,095	1,094,515
Kurov* ..	960 4 2	..	2,109 18 5	3,070 2 7	172,460	..	172,460
Totals ..	195,670 2 0	38,716 17 6	38,635 12 10	273,022 12 4	157,846,757	119,240,640	13,669,784

* Nursery now closed.

SUMMARY OF OPERATIONS IN PLANTATIONS FROM 1896 TO 1925.

Name of Plantation.	Trees.				Total Expenditure to Date, including Cost of Trees from Nurseries.	Total Area planted.	Total Expenditure per Acre planted, including Cost of Buildings.
	Number raised from Seed sown in Situ.	Number received from Nursery.	Number used to replace Losses.	Total Number in Plantations.			
Whakarewarewa	109,725	20,603,250	3,976,664	16,736,311	£ 120,909 7 5	Acres. 8,037	£ 15 0 11
Waiotapu	83,121	23,506,152	4,860,134	18,729,139	91,656 19 3	7,010	13 1 6
Kaingaroa Plantation ..	124,600	32,901,960	3,188,160	29,838,400	158,184 0 8	29,203	5 8 4
Puhipuhi	..	1,419,000	419,000	1,000,000	12,765 19 4	1,200	10 4 5
Conical Hills	..	10,759,001	1,472,705	9,286,296	64,218 18 0	3,533	18 3 5
Pukerau	..	903,135	83,138	819,997	9,981 18 7	573	17 8 6
Dusky Hill	..	3,061,997	881,160	2,180,837	24,573 19 1	746	32 16 1
Greenvale	..	3,700,745	372,855	3,327,890	47,182 14 3	2,651	17 15 10
Gimmerburn	..	936,235	783,339	152,896	6,907 0 1	88	78 9 9
Naseby	..	5,733,698	796,680	4,937,018	46,717 18 6	2,297	20 6 9
Hanmer Springs	..	10,443,623	4,854,699	8,588,924	57,068 15 0	4,233	13 9 7
Balmoral	..	3,558,447	739,990	2,818,457	39,346 1 9	2,488	15 16 2
Raincliff	..	..	..	50,000	1,143 2 2	206	5 10 11
<i>Experimental Group.</i>							
Waitahuna	..	42,025	11,500	30,525	330 7 9	11	30 0 8
Dumgree	..	1,712,265	1,110,125	602,140	16,883 15 8	257	63 13 10
Galloway	..	6,930	3,050	3,880	84 19 10	2	42 9 11
Omarama	..	4,390	..	4,390	80 12 9	2	40 6 5
Westland	..	215,450	..	215,450	3,156 5 4	340	9 5 8
Tangimoana	..	47,000	..	47,000	206 19 11	68	3 0 10
Totals	317,446	119,555,303	20,553,199	99,416,550	701,675 4 7	62,945	..

ANNEXURE V.—EXPORTS AND IMPORTS OF SAWN TIMBER AND OTHER FOREST PRODUCTS.

EXPORTS.

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1922, 1923, 1924.)

Item.	1922.		1923.		1924.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Totals	Sup. Ft. 44,214,499	£ 480,121	Sup. Ft. 48,093,506	£ 471,805	Sup. Ft. 43,323,049	£ 47,944
Kauri	3,017,607	58,731	3,011,151	60,272	1,946,489	38,620
Rimu	4,696,767	40,601	7,575,181	59,926	5,451,106	45,953
White-pine	35,177,764	363,668	34,897,728	320,409	33,375,876	360,196
Beech	709,675	10,166	1,266,869	16,438	1,328,683	17,522
Other (New Zealand) ..	595,663	6,528	817,561	8,229	826,572	9,822
Other (foreign)	17,023	427	525,016	6,531	394,323	5,831
Tanning-bark	Tons. 38	813	Tons. 73	1,045	Tons. 25	250
Kauri-gum	6,391	563,270	6,598	596,222	5,261	443,576
Fungus	162	22,271	97	9,202	..	..

IMPORTS.

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1922, 1923, 1924.)

Item.	1922.		1923.		1924.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Ironbark	Sup. Ft. 13,601,957	£ 228,943	Sup. Ft. 12,806,905	£ 194,478	Sup. Ft. 24,416,247	£ 397,900
Jarrah	4,764,603	75,605	8,973,586	127,804	11,081,776	170,176
Douglas fir	3,974,811	33,190	8,081,088	77,473	13,835,742	122,332
Other	9,000,270	155,494	10,457,784	211,478	17,251,286	328,880
Total	31,341,641	493,232	40,319,363	611,233	66,585,051	1,019,288
Laths, rails, palings, &c. ..	Number. 6,563,749	14,542	Number. 13,709,189	27,329	Number. 10,573,693	24,697
Tanning-bark	Tons. 1,623	21,860	Tons. 3,433	38,517	Tons. 2,469	29,347
Wood-pulp	732	10,840	855	12,784	2,700	36,393

ANNEXURE VI.—STATE FORESTS ACCOUNT.

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1925.

	Receipts.			Payments.		
	£	s.	d.	£	s.	d.
To Cash in hand, 1st April, 1924—						
In Treasury Stamp Duties Suspense Account	93	11	9			
In Post Office	3,212	5	10			
				3,305	17	7
In Public Account	10,913	16	10			
In Investments Account.. ..	144,700	0	0			
				155,613	16	10
Interest on securities invested				158,919	14	5
Debentures issued, Selwyn Settlement				6,726	12	0
Forest receipts—				100,000	0	0
National endowment	11,247	10	6			
Timber-sales	124,917	18	3			
Timber royalties	5,426	14	11			
Timber trespass	239	6	3			
Leases—Grazing	2,251	15	7			
Leases—Sawmill-sites	663	17	10			
Leases—Building-sites	11	10	0			
Leases—Industrial	576	13	3			
License and transfer fees	170	7	6			
Miscellaneous	107	3	3			
Permits—Grazing	92	18	0			
Permits—Miscellaneous	732	10	6			
Kauri-gum	763	15	1			
Fees for inspections	323	18	2			
Interest on overdue promissory notes	120	4	11			
Rental on houses	42	14	0			
Opossum revenue	2,784	12	2			
	150,473	10	2			
	295	12	10			
Less adjustments, Lands and Survey				150,177	17	4
Nurseries and plantations—						
Trees	8,704	6	11			
Seeds	970	2	11			
Firewood and poles	149	10	7			
Grazing	510	13	0			
Rental of houses	656	8	6			
Sheep and wool	14	10	0			
Miscellaneous	285	1	7			
				11,290	13	6
				161,468	10	10
Recoveries of expenditure and credits-in-aid—						
Sub. I.—Salaries	390	0	0			
Sub. II.—General Development of State Forests—				478	0	11
Destruction of pigs	156	0	11			
Sale of motor-car	132	19	4			
Timber-cruising	69	13	1			
Sundries				748	13	4
By Charges and expenses for raising loans—						
Recoupment of management charges on consolidated stock				2	11	7
Stamp duty on transfers				82	14	11
				85	6	6
Interest on loans				23,157	6	7
Sinking fund				893	0	10
				24,050	7	5
National Endowment Account				12,611	11	7
Lands for Settlement Account—Selwyn Settlement				100,000	0	0
				112,611	11	7
Transfer to Deposit Account on account of Native owners, Lot 3, Whangamarino Parish				459	8	6
				137,206	14	0
Capital charges—						
Sub. II.—General development of State forests—						
Buildings				506	17	5
Motor-vehicles, field and office equipment ..				1,437	5	3
Forest atlas				299	5	1
Roads, trails, and telephone-lines				345	12	2
Demarcation				359	6	7
Salaries				236	14	7
				3,185	1	1
Sub. III.—Forest-fire prevention—						
Equipment and protection improvements ..				151	8	8
Sub. IV.—Educational—						
Reference library				98	2	10
Photographic equipment				1	17	3
				100	0	1
Sub. V.—Forest research—						
Forest experimental station, Westland ..				1,499	13	10
Salaries				26	18	6
Timber testing and ecological equipment ..				249	4	6
				1,775	16	10
Sub. VI.—General afforestation—						
Nurseries and plantations planting				47,939	15	6
Salaries (afforestation)				9,343	10	7
Land for extension of nurseries and plantations				476	10	0
Sand-dune reclamation				2,317	18	1
Temporary assistance				766	8	8
				60,844	2	10
Sub. VII.—Acquisition of indigenous forests—						
Purchase of part Runanga 2A Block and other lands				5,992	16	4
Operation and maintenance charges—						
Salaries				22,299	8	1

[illegible]

NOTE.—The receipts include amounts received by the Post Office before the close of the financial year, but not paid into the Public Account until after the 31st March, 1925.

5th June, 1925.

I hereby certify that the statement of receipts and payments has been duly examined and compared with the relative books and documents submitted for audit, and correctly states the position disclosed thereby.—G. F. C. CAMPBELL, Controller and Auditor-General.

E. PHILLIPS TURNER, Secretary of Forestry.
A. W. GYLES, Accountant.

LOAN ACCOUNT AS AT 31ST MARCH, 1925.

To Loan authority—	£	s.	d.	By Debentures issued—	£	s.	d.
Section 40, Forests Act, 1921–22 ..	500,000	0	0	Finance Act, 1916 (section 50), at 4½ per cent. ..	50,000	0	0
Section 50, Finance Act, 1916 ..				Finance Act, 1918 (No. 2), (section 32), at 4 per cent. ..	100,000	0	0
Section 32, Finance Act, 1918 (No 2) ..				Finance Act, 1918 (No. 2), (section 32), at 4½ per cent. ..	100,000	0	0
Section 16, Finance Act, 1920 ..				Finance Act, 1920 (section 16), at 4½ per cent. ..	45,000	0	0
Section 40, Forests Act, 1921–22, and section 16, Finance Act, 1924	100,000	0	0	Finance Act, 1924 (section 16), at 5 per cent. ..	100,000	0	0
Section 8, New Zealand Loans Act, 1908	4,396	13	5	Stock issued—			
				Finance Act, 1916 (section 50), and Finance Act, 1920 (section 16)—			
				New Zealand consolidated stock, 1936–51, at 6 per cent. ..	1,774	12	10
				New Zealand consolidated stock, 1936–45, at 5 per cent. ..	204,396	13	5
				Balance of authority ..	3,225	7	2
	£604,396	13	5		£604,396	13	5

NOTE.—The authorities under the Finance Acts, 1916, 1918, 1920, were repealed by section 40, Forests Act, 1921–22.

ANNEXURE VII.—STATE FORESTS ACCOUNT, 1917–25.

Fiscal Year.	Receipts.				Payments.			
	Forest Income.	Loans raised.	Interest on Investments.	Total.	Capital.	Operation.	Interest on Loans.	Total.
	£	£	£	£	£	£	£	£
Balance, 31st March, 1917 ..	..	..	..	2,530	..	..	..	..
1917–18	13,299	28,100	..	41,399	40,865	988	902	42,755
1918–19	7,529	36,900*	..	44,429	39,162	2,182	1,861	43,205
1919–20	8,514	65,000	..	73,514	60,844	5,975	3,577	70,396
1920–21	19,518	70,000	..	89,518	64,802	14,570	6,127	85,499
1921–22	30,784	86,780	..	117,564	69,840	38,087	9,797	117,724
1922–23	63,372	214,221	2,935	280,528	51,823	38,591	19,701	110,115
1923–24	93,480	209	6,013	99,702	54,323	43,077	23,172	120,572
1924–25	161,469	100,000	6,727	268,196	171,920†	56,245‡	23,157	251,322
					Balance, 31st March, 1925 ..			175,792
				1,017,380				1,017,380

* Includes £10,000 from Consolidated Fund.

† Includes £100,000 purchase of Selwyn Settlement forest.

‡ Includes £12,612 transferred to National Endowment Account.

NOTE.—Credits-in-aid and recoveries have been deducted from expenditure.

Approximate Cost of Paper.—Preparation, not given; printing (1,525 copies, including graphs and illustrations), £81.

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