1944

NEW ZEALAND

STATE FOREST SERVICE

ANNUAL REPORT OF THE DIRECTOR OF FORESTRY FOR THE YEAR ENDED 31ST MARCH, 1944

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, 27th July, 1944.

I have the honour to present herewith, pursuant to section 64 of the Forests Act, 1921–22, the annual report of the operations of the State Forest Service for the year ended 31st March, 1943.

In view of the concurrent preparation of a separate report on post-war forest policy, only a brief reference has been made to policy matters, except those of urgent and immediate pertinent interest.

As in previous war years, much of the report is presented in precis form, with comparative statistics for corresponding dates or periods for the previous year shown in parentheses.

I have, &c.,
ALEX. R. ENTRICAN,
Director of Forestry.

The Hon. the Commissioner of State Forests.

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REPORT

CHAPTER I.—FOREST POLICY

1. *General Administration.*—Emphasis on the maintenance of timber-supplies for essential purposes has continued throughout the year, but with the tapering-off of defence works it has been possible to devote more time to rehabilitation and post-war planning. Skeleton development and operational schemes covering all major rehabilitation forest projects for which land is available have been completed, and work commenced on a long-term twenty-five-year post-war policy plan covering all phases of both public and private forestry.

2. *Recruitment and Training.*—The policy has been continued of recruiting trainees from secondary schools, of affording them facilities for University training, and of giving rotational field experience on various classes of forest work during long University vacations. This is having the result of attracting a good class of applicant and of allowing the aptitude of recruits to be developed to the best effect and their training varied according to the dictates of their performance on forest works. With the efflux of time the services of numerous field officers for the arduous duties of forest reconnaissance and timber cruising are no longer available and it is now necessary to recruit officers for this work from more senior men, preferably with a rural or bush background. Training courses for these recruits are being provided at the Forest Service Training Centre at the Whakarewarewa State Forest, Rotorua. A policy has also been adopted by the Government whereby departmental officers serving with the Armed Forces overseas are being afforded an opportunity of widening their experience by working with forest authorities of Allied Governments before returning to duty in New Zealand.

3. *Indigenous-forest Resources.*—Further study of the projected post-war national inventory indicates that, even with the aid of aerial photography, the field-work will occupy five years; but providing the basic data, as it will, for a fifty-year plan of forest development and improvement, its importance cannot be overestimated, and the forthcoming training courses for timber appraisers will lay the foundations for building up the necessary field staff. The inventory will cover forest land of all tenures, and indicate the sufficiency or otherwise of supplementing exotic resources and assist in determining the rate at which in subsequent years it will be necessary and/or practicable to transfer timber-production from indigenous to exotic stands.

4. *Indigenous-forest Management.*—Owing to the shortage of suitable field staff, extensive forest reconnaissance has been severely restricted, but work has been concentrated upon the development of two areas from which supplies of logs can be made available for a sufficiently long period as to warrant the establishment of modern milling, power, waste-burning, and kiln drying equipment and the provision of good housing accommodation and village amenities. Only the advent of war has prevented the earlier and more widespread adoption of such developments and their management under working-plan control. The development of a number of most undesirable practices and trends in the procurement of timber resources from both State- and Native-owned forests is discussed in Chapter VIII (page 13, paragraph 64), and Chapter XII (page 27, paragraph 108).

5. *Indigenous Silviculture.*—Continuing observations upon trial regeneration and cultural improvements in both kauri and beech forests are serving to clarify the problem of treating extensive areas of these species in the post-war period. These species appear much more amenable to treatment than rimu, trials and observations of which must be persevered with over very many years before any valid conclusions can be drawn. Seed crop and growth cycle reports on significant tree and shrub species are proving to be of ever-increasing importance in solving the numerous problems attached to the fundamental objective of converting the Dominion's characteristically stagnant forests into healthy productive stands.

6. *Exotic-forest Resources.*—Priority has been accorded to assessment surveys in all the older exotic forests, and results are sufficiently advanced to be able to say that for the immediate post-war period there will be available for annual sale to private enterprise some 6,000,000 cubic feet of logs in the Rotorua Conservancy for conversion in economic-sized units—primarily by log frame sawing, as demonstrated at the Forest Service Waipa Mill in the Whakarewarewa State Forest. The departmental views on the limitation of its sawmilling activities to demonstration and key control units is reviewed in Chapter VIII (page 15, paragraph 69).

7. *Exotic Silviculture.*—Highlight of the year's experience has been the assured success of natural regeneration of insignis pine in the Whakarewarewa State Forest logging operations. As had been anticipated from observations elsewhere, natural regeneration was threatened for several years by *Hylastes ater,* and this year's record of a further recession of the attack augurs well for the future management of the country's insignis-pine stands. Recording of seed crops and of growth-cycle observations on the principal exotic species have been continued as fundamental to the solution of silvicultural problems.

8. *Local-body and Private Forestry.*—The inevitable adaptation of exotic softwoods to building purposes is now becoming more widely appreciated, and the advantages attendant upon the creation and management of local exotic forests are winning recognition in timberless districts. A study of the means of encouraging both local bodies and farmers to establish exotic forests and woodlots, however, indicates the imperative necessity for any such resources being placed under such supervision as will ensure their protection and

management on a perpetuating basis. The same comment applies to private and public-company owned exotic forests, which should be regarded as quasi-public assets. These forest properties should be maintained in a condition of maximum productivity by the adoption of such appropriate protective, silvicultural, logging, and re-establishment measures as will ensure their management in perpetuity; recognition of these views is reflected in the willingness of some owners to incorporate relevant provisions in sale agreements with intending loggers and sawmill operators.

9. *Forest Fire Protection.*—Forest fire protection in New Zealand rests on a permissive basis, as a result of which many forest-owners rely on their neighbours, sometimes the State Forest Service, sometimes other forest-owners, for no inconsiderable portion of their fire protection. If forests, whether they be indigenous or exotic, and whether they be State, Native, or privately owned, are to be regarded as public assets, as they should be, then all should receive from their owners a certain minimum of fire protection, and possibly some of it provided for from public funds. It is therefore believed that the time has now arrived in the development of forestry in New Zealand when forest fire protection should be moved from the permissive to a compulsory basis and appropriate powers secured whereby forest and land owners may be suitably combined to finance and operate an adequate fire protection system for their resources. The occasional use of an aerial fire patrol in the Rotorua-Taupo district during the last fire season proved so extremely useful in the early detection and control of fires that their general employment post-war should be provided for; arrangements have already been concluded for the 1944–45 fire season whereby a regular aerial patrol will be provided in the Rotorua-Taupo district.

10. *Forest Utilization.*—The general picture of forest and timber utilization in the future is being thrown entirely out of focus by popular misconceptions regarding various technical advancements in the plastics and chemical fields. Such advancements are essentially refinements in the employment of wood, making it more useful through improved strength, hardness, and durability. Without exception, they are of little significance as regards materially increasing the over-all volume of wood use, or of substantially economizing forest resources. It has been estimated that if every known chemical development was to be applied to the world's forest-product industries, the markets for economically priced chemical wood products, including pulp and paper, rayon, plastics, &c., would not absorb even 20 per cent. of the total annual production of raw forest material. So serious is the popular misconception in respect to plastics that the leading manufacturers are warning the public by means of wide-spread advertisements that plastics will not and cannot replace wood—largely because they are so very expensive—but can only improve its performance, a comment which is likewise applicable to methylolurea, recently announced as allowing relatively soft woods to be given an extremely hard surface. The treatment would have been of more interest had it been a softening process which allowed rimu and matai to be nailed easily and without splitting.

The essence of the whole matter is that the saw log and its sawn timber is the basic product of the forest and is likely to remain so for all time. Upon this fact the country's forest economy must be based; and for this reason New Zealand forestry has reached a critical stage in its development. The imperative necessity for relieving the drain upon its indigenous resources, by increased usage of exotic timber, has long been a theme of Forest Service reports. The realization of this objective is now threatened by a tendency to perpetuate the methods of indigenous-timber conversion in the exploitation of the exotic resources. Unless firmly resisted, such a development spells a national disaster of the first magnitude in the country's forest economy. The question is further discussed in Chapter VIII (page 15, paragraph 69).

11. *Forest Finance.*—Discussions have continued with the Treasury on the subject of reorganizing the national forest finances, under which interest is charged at 4 per cent. on net finance required for the State Forests Account as well as on accumulated advances of previous years. The earlier compound interest remains in the forests accounts, and since 1940 simple interest only has been charged on total loans. Such a system of accounting is not only completely unrealistic, but fails to present a true picture of the departmental operations. In order to expedite the desired reorganization, the Government arranged for one of the departmental accounting staff who had completed his overseas service with the Forestry Units to be seconded for study of forest financing and accounting methods in Great Britain, North America, and Australia, as a result of which it is planned to inaugurate marked improvements in the Department's estimates, budget control, accounting, &c., as well as in the complete recasting of forest finances.

12. *Soil Conservation.*—Long-continued insistence by the Forest Service that the only realistic and economic solution to the problem of erosion control lies in Dominion-wide control of land-burning operations is at last winning wide recognition. This is reflected by the support recently forthcoming from the various Advisory Committees which now function under the Soil Conservation Council, and a great step forward will be achieved if the newly appointed Catchment Boards concentrate upon this phase of their operations.

One aspect of soil conservation constitutes a serious threat to the national forest economy. Well meaning but unrealistic enthusiasts advocate a lock-up-use-not policy of forest reservation, under the mistaken impression that such a practice will perpetuate the principal indigenous species such as rimu, matai, &c. The exact reverse would occur in most forests. Why do so many of our rimu forests consist of virtually only old trees with seedlings and medium-age trees so few as to be insignificant? The initial cause is the fact that, no matter how prolifically the old trees seed, the humus on the floor is so thick that, even when the seeds germinate, roots are seldom able to penetrate to the mineral soil beneath, and most seedlings therefore die. The next phase is that those which do succeed

in establishing themselves ultimately languish and die from lack of light on the forest floor. In contrast, when heavy gales, for example, devastate large stretches of forest by uprooting many trees, the mineral soil is sufficiently exposed to allow seedlings to develop and a replacing forest of the same species to succeed its parent forest.

The adoption of a lock-up-use-not policy would certainly result in either the displacement of magnificent rimu by some minor and much less useful species such as kamahi or tawa, or by devastated areas devoid of any trees of substantial size for a century or more. To a thinking conservationist either alternative is a contradiction in terms. True forest conservation is preservation by wise use. The very logging of the larger millable boles not only exposes the mineral soil for rooting in the seeds from the remaining trees, but opens up the canopy sufficiently to assist the subsequent development of the young seedlings. Thus conditions more favourable to the replacement of the major forest species are secured at the same time as a crop of useful timber, which otherwise would rot away and decay. What is of vital importance is that in not the slightest degree is the soil-stabilizing value of the forest adversely affected by the removal of this crop of a few trees out of a total of many hundreds of plants per acre. The term "crop" is used advisedly, because timber is just as much a renewable resource when taken from the indigenous forest on a rotation of centuries as when taken from an exotic forest on a rotation of thirty or forty years. Logging admittedly creates inflammable debris for a few years, but, as a result of Forest Service propaganda, regulations, and law enforcement, fires on all forest lands are being annually reduced, both in area and in numbers, and on State forests have been virtually eliminated.

Controlled logging and fire-prevention are therefore the essence of New Zealand's forest economy, just as multiple use is the essence of national forest policy. The ultimate objective of forest management is to convert every acre of utilizable indigenous-forest land into a state of maximum productivity—a productivity which is measured in terms not merely of cubic feet of timber grown annually on each acre, but of stream-regulation values, of aesthetic and recreational worth, &c. Most of the Dominion's forest resources, even in the high country, can be managed on such a multiple-use basis, and should be so managed. This, however, is not to be interpreted as implying that the whole remaining indigenous resource should be logged as rapidly as possible. Rather the reverse. Yielding as it does the country's only supply of high-quality, defect-free timber, this resource should be rationed down to absolutely essential requirements for such timber, and as much as possible of current demands met by the exotic forests. Only by this means can a sustained and balanced yield of both indigenous and exotic timbers be assured to the country.

All appropriate basic measures to achieve the various aims and purposes of the national forest policy are being persevered with even during the war period. Suspicions, however, have been voiced that pressure has been brought to bear upon the Forest Service to dispose of State timber resources for the sake of increasing revenues and of keeping individual mills in operation. Nothing could be further from the truth. Not since the inception of the Department has any Administration even considered, let alone ordered, that the forest resources should be sacrificed for revenue getting, and not 1 acre of State timber has been released during the war period except in the public interests or for the successful prosecution of the war. These are categorical statements requiring no apology, the more so because local forest sentiment is meticulously studied and every effort made, consistent, of course, with the war effort and other questions of public interest, to foster Dominion-wide support of the national forest policy.

CHAPTER II.—ADMINISTRATION

13. *Permanent and Temporary Staff.*—Permanent, 224 (210); temporary, 145 (131). The increase is due to cadets appointed to the permanent staff, and to war relieving personnel appointed to the temporary staff.

14. *Military Service.*—Second New Zealand Expeditionary Force, 58 (58); R.N.Z.A.F., 23 (25); Territorial, 13 (40); Navy, 11 (1).

15. *Casual Staff.*—Average for year, 915 (920).

Major concern is expressed hereon, as some forest stations have inadequate suitable personnel to combat fires. Fire-fighting requires young, fit men, but the labour personnel left at many of the stations is numerically and physically incapable of meeting a major outbreak, and relief for the next fire season is being sought from the National Service Department.

16. *Honorary Staff.*—Honorary Forest Rangers, 250 (233); 24 new appointments and 7 resignations.

17. *Health of Staff.*—The amount of overtime still being worked by some officers as a result of extra wartime activities gives rise to serious concern, but should be materially reduced with the announced easing of the general man-power position. The general health of the staff continues to be satisfactory, except in the case of older officers who have been engaged on timber appraisals over a long period of years. Such duties are particularly arduous, and officers engaged thereon should be transferred to other field duties periodically. Even the younger officers on this work must be relieved, and preparations are in hand for the appointment and training of sufficient new appraisers both to replace the older staff and relieve the younger.

18. *Safety of Employees.*—Total accidents, 256 (169), made up as follows: cuts, 67 (52); strains, 61 (39); fractures, 4 (8); crushes and bruises, 78 (37); septic wounds, 23 (9); eye injuries, 7 (9); miscellaneous, 16 (15). In addition, it is reported with regret

that there were four fatal accidents: one in Auckland, one in Rotorua, and two in Nelson. One of the Nelson fatalities concerned an employee of another Department who met his death while assisting to fight a fire in a State forest; the others were Service employees. In all cases these fatalities were due to circumstances beyond the control of the Service.

19. *Compensation to Employees.*—The Service continues to carry its own accident-insurance risk, and the total compensation payment, total wages, &c., are as under:—

Year.	Total Payments.	Total Wages.	Per Cent. (Approx.).
	£	£	£ s. d.
1942–43	4,426	261,000	1 13 11
1943–44	4,804	255,611	1 17 7

For the year the estimated premium payable for a comprehensive accident policy would have been £10,600; a saving of £5,800 has thus been effected.

The increases in the number of recorded accidents and in compensation payment are due to—

(*a*) Greater pressure being brought to bear upon employees to report even minor injuries so that these may receive urgent first-aid attention:

(*b*) The increasing numbers of older and unskilled men now being employed as a result of the shortage of young, skilled operatives:

(*c*) The larger proportion of employees now being engaged on the more hazardous work of tree-felling, &c., instead of on ordinary forestation operations.

20. *Recruitment.*—The class of applicant now coming forward from the secondary schools for appointment to the Forest Service continues to show heartening improvement. Twenty-one trainees were appointed during the year in continuation of the policy of providing forestry experience and training to suitable young men in the earliest possible stage of their careers. Of these recent appointments, however, seven are now on active service, bringing the number of trainees serving with the Armed Forces to thirty-six.

21. *Training.*—As a result of the policy of recruiting trainees below military age whenever possible, twenty-four trainees were actually employed and trained during the year. Fourteen professional trainees were provided with part-time facilities for University study in approved science subjects as a preliminary to technical forestry training, and during the long vacation were afforded practical experience in the field.

To meet the present shortage of field officers and the anticipated demand for a rapidly increasing staff to control immediate post-war forest projects, fifteen new timber appraisers are now being appointed, and will receive intensive training at the Forest Service Training Centre which has been established in the old Whakarewarewa Forest headquarters. Refresher courses for both junior and senior officers will follow.

A saw-doctors' school—the first of its kind in the Southern Hemisphere—has been established at the Waipa Mill, and similar training courses on timber-grading and kiln drying are planned as a direct contribution to trade training for the timber industry.

An introductory course in forestry has been prepared by the Forest Service for the Army Education Welfare Service. In addition to the immediate value of such courses, this, and more advanced courses under preparation, should prove to be important contributions to the post-war forestry training of junior departmental officers.

22. *Examinations.*—One trainee has graduated (B.Sc.) during the year; several other trainees who would have completed their degrees this year are on active service. One senior and three junior Efficiency Tests were credited to departmental officers during the year.

23. *Allocation of Duties.*—Numerous officers continue to be seconded for timber-control activities at considerable sacrifice to their normal duties, but with the easing of the general man-power position it is anticipated that sufficient officers will be released from the Armed Forces to overtake important arrears of work.

24. *Field and Office Inspections.*—The Chief Inspector returned from military service during the year, and undertook a comprehensive review of field personnel with a view to formulating plans for the inauguration of refresher training courses for all grades of rangers. Office inspections were not as frequent as desired, mainly because of other urgent work—*i.e.*, the payment of purchases arranged by the Office of the Timber Controller, which during the last twelve months involved continuous attention from clerical controlling officers.

25. *Regional Organization.*—No major change in policy has taken place, but regional officers have had to handle to a greater extent than hitherto matters affecting the timber industry, such as the supply of labour through local Man-power Advisory Committees and, in the larger centres, the supply of timber to and its distribution by Timber Allocation Committees.

26. *Inter-departmental Co-operation.*—Specific mention is made of assistance rendered by accounting officers of the Railways Department, who have worked for nearly the whole year on overtime in recording, checking, and adjusting and passing for payment the various freight and timber accounts involved in the special purchases made by the Timber Controller for various defence works. The purchase of land for forest purposes continues to be handled by the Lands and Survey Department, with excellent results.

CHAPTER III.—CONSTITUTION OF STATE FORESTS

27. *Changes in Area.*—During the year 76,032 acres were set apart as permanent and provisional State forest and 1,777 acres withdrawn from reservation, a net increase of 74,255 acres. The area under State forest reservation now totals 9,027,051 acres, equivalent to 13·6 per cent. of the land area of the Dominion. Of this total 6,089,488 acres are permanently reserved, being 67·4 per cent. of the total State forest area (see Appendix I). The purchase of land for post-war and rehabilitation projects is separately reviewed in Chapter XI (page 24, paragraph 98).

28. *Change in Status.*—A total of 146,779 acres of provisional State forest were permanently reserved; this area mainly comprised upland forest in the South Island. The area withdrawn from State forest reservation was made available for settlement purposes.

CHAPTER IV.—FOREST MANAGEMENT

29. *Surveys.*—Depleted staffs again greatly curtailed survey operations. In exotic forests 30 acres were topographically surveyed, and forest-type surveys were carried out over 1,045 acres. Timber-appraisal surveys of 131 areas of indigenous forest totalled 26,640 acres, while 5 areas totalling 3,239 acres were covered by forest reconnaissance. Aerial photographs have proved of great value for forest inventory and reconnaissance purposes and have effected a considerable saving of time and field work. Nine mosaic copies and 162 prints covering an area of 420 square miles were added to the library of aerial photographs during the year, while 17 duplicate mosaic copies were obtained for the use of conservancy offices. The library now contains 30 mosaics covering 980 square miles.

30. *Mapping.*—Owing to shortage of staff, work during the year was limited to current requirements and maintenance. Additions were made to 46 stock and operational maps, while 3 forest atlas sheets were renewed and 37 new plans were recorded. Large additions to the draughting staff are urgently required in order to overtake serious arrears in mapping work and to service post-war and rehabilitation projects, and a commencement has already been made in obtaining the services of returned servicemen for training in this activity.

31. *Forest-management Staff.*—One assistant forester returned from military leave and was reposted in charge of training duties at Head Office. Work connected with timber control and post-war rehabilitation projects again prevented the technical assistant staff from devoting anything approaching full time to forest management.

32. *Forest Working Plans.*—The cut of living or "green" kauri under the working plan for the kauri working circle was unavoidably exceeded to maintain supplies for the building of small naval vessels, and Ministerial approval of the excess fellings was recommended and sanctioned pursuant to the Act.

Growing-stock assessments were commenced in four exotic forests—Maramarua (3,050 acres completed), Kaingaroa (6,336 acres completed); Balmoral (1,063 chains of plot pruned and cut ready for enumeration of 17 compartments); and preliminary pruning and line-cutting were undertaken at Puhipuhi. In the younger of these forests insignis-pine stands are being assessed first, for working under a separate working circle. The assessment of Waiotapu Forest was completed for all species, while that of insignis and prickly-cone pines on Golden Downs Forest was completed for 4,352 acres on 29 compartments, leaving 12 to complete. Working plans for four further exotic forests and two kauri forests are in draft form or in course of preparation. Blue Mountains Forest was subjected to a more logical and convenient subdivision into compartments.

CHAPTER V.—SILVICULTURE

33. *General.*—Labour available for silvicultural works was again limited to bare maintenance personnel. The area of new planting dropped further to 1,183 acres, and pruning and thinning were again possible on only 1 per cent. of the total planted area. Under present conditions attention is being confined mainly to blanking and restocking of existing compartments.

34. *Natural Regeneration.*—In the more open portions of kauri forest felled under working plan, kauri germination again suffered high mortality during the hot dry summer period, but it is quite satisfactory where side shade is provided by underscrub. A quantity of seed of manuka, the nurse shrub for young kauri under natural conditions, was collected for broadcast sowing in order to assist regeneration, which is also being supplemented by planting.

Natural regeneration of insignis pine in clear-felled compartments in Whakarewarewa Forest may now be termed successful, though planting of a small proportion of the compartments is of course necessary, mainly where mechanical extraction has bared and hardened the ground (see also paragraph 41, below).

35. *Interplanting Indigenous Forests.*—The small amount of planting stock available was utilized in stocking 95 acres of worked podocarp forest with shade-bearing exotic conifers.

36. *Afforestation.*—Only 1,088 acres of new area were planted with exotics, but 1,382 acres were blanked and 3,695 acres replanted. Planting and silvicultural statistics are presented in Appendix II. Indigenous- and exotic-tree seed collected amounted to 38½ lb. and 357 lb. respectively.

37. *Nursery Operations.*—From 1,044 lb. of tree seed sown (including 5 lb. of indigenous species) 2,583,000 seedlings were obtained; trees lifted for planting amounted to 4,860,000, while 298,000 trees were lined out. At the close of the year there were 7,500,000 trees in the nurseries.

38. *Tending of Indigenous Forests.*—In conjunction with forest patrolling, kauri saplings were released from competing scrub as far as was possible.

39. *Tending of Exotic Forests.*—Trees were released from fern, &c., on 1,195 acres; low pruning to about 8 ft. high covered 3,888 acres, and high pruning 505 acres. The total area thinned was 782 acres, and 145 acres were clear-felled.

40. *Silvicultural Investigations.*—Further small experimental plantings were made on areas acquired for afforestation during the post-war rehabilitation period, and these trials will be extended in the coming year with a view to ascertaining, so far as is possible from strike and early development, what exotic species are most suited to the various localities. Interplanting of worked podocarp forest has been confined, in past routine operations over extensive areas, to the use of shade-tolerant exotic conifers, but a trial use of exotic hardwoods was made three years ago. Of these, two South American beeches now show splendid height and development, as also does the red-alder, while the indigenous red and silver beeches are not far behind.

41. *Experimental Plots and Statistical.*—A plot established a few years ago to study the effect upon kauri regeneration of removing all but the herbaceous undergrowth in a mature kauri stand was re-examined, and, while kauri-grass has reappeared very slightly, the miniature tree-fern was found to have reinvaded almost the whole of the plot. Its suppression of kauri seedlings was so severe as to indicate that where it is present in abundance its removal from kauri-regeneration blocks will be necessary.

In Rotorua Conservancy, Monterey cypress planted five years ago under a light canopy of *Eucalyptus ovata* showed a height development of 9·6 ft., while that planted under a dense *E. tasmanica* canopy grew only 2·7 ft. in the same period.

In Wellington Conservancy a series of plots was formed at time of planting in the year 1929 for studying suitability for site and development of certain exotic trees in worked podocarp forest that had been burned over prior to planting. As a result of a recent examination the main purpose of the plots has been changed to a study of the incidence of the common shoe-string fungus which seriously affects some exotic species interplanted in worked podocarp stands, whether burned over or not. The following species are susceptible to the fungus attack in the order shown, mortality being particularly high in the first three mentioned: American eastern white-pine, prickly-cone pine, Lawson's cypress, ponderosa pine, Corsican pine, lodgepole pine. Douglas fir and western red-cedar are not attacked.

Observations made in plots of exotic conifers planted during 1927–29 at high altitudes in Karioi Forest, on the central North Island plateau, revealed that lodgepole and ponderosa pines are the most thrifty species, then Austrian, Scots, and jack pines, and next in order northern pitch pine and American eastern white-pine. Other species, including insignis pine, gave poor results. As might be expected at such altitudes, extending from 2,200 ft. to 3,800 ft. above sea-level and under exposed conditions, trees of all species are heavily branched and of poor timber form, while the risk of snow and windbreak is always present. The study provides a good indication of the most suitable tree species for use in the extension of upland protection forests.

Many of the plots under observation in compartment 22/2, Whakarewarewa Forest, for the study of regeneration of insignis pine after clear-felling have fulfilled their purpose and have been thinned to a reasonably small stocking per acre. The fourteen plots that were recounted three times during the year at approximately four-monthly intervals revealed a successive stocking per acre of 2,666, 2,881, and 3,071. Trees killed by *Hylastes ater* during the same periods numbered 38, 20, and 1 per acre under the respective successive recounts. Only two plots showed the necessity of supplementary stocking by artificial planting, and they were located on logging-tracks and log-assembly areas. Plots on areas experimentally burned in June, 1942, produced very few seedlings and have been artificially planted up.

Six new plots were established for studying the following silvicultural problems: (1) development of western red-cedar mixed with European larch in a thirty-four-year-old stand (larch is being suppressed); (2) development of a thirty-five-year stand of lodgepole pine stand-cleaned at twenty-three years; (3) behaviour of an insignis-pine stand thinned at twenty-three years to 164 crop trees per acre; (4) increment in a Corsican-pine stand thinned from 1,258 to 430 trees per acre at thirty-three years; (5) regeneration of insignis pine clear-felled at nineteen years (3,040 well-distributed seedlings per acre were counted one year after felling, losses from *Hylastes ater* being only 4 per cent.).

42. *Forest Botany.*—Projects instituted two years ago for the organized collection and recording of phenological data relating to the main exotic tree species were continued and extended to embrace the main indigenous species, and projects relating to collection and testing of tree seeds and to seed storage were continued. The 1943–44 season, like its predecessor, proved on the whole a poor seed year. Many years' observation will be required before the full value of the phenological studies can be realized. A few seed samples were sent abroad under exchange for exotic seeds.

CHAPTER VI.—FOREST PROTECTION

43. *Fire Protection.*—The summer of 1943–44 was very dry; even on the west coast the fire hazard was unusually high. The total number of fires reported from the lookouts in State forests was 2,541, but only 40 of these fires were in State forests, involving an area of 1,447 acres, most of which was scrub or fern country.

The most serious fire was in the Taupo-Wairakei locality, 38,400 acres being burnt over. Although only 70 acres of exotic forests were destroyed and the balance scrub and fern, the scenic amenities of this popular tourist area have been ruined for many years owing

to the wide-spread distribution of naturally regenerated pine-trees, the stark, blackened boles of which will remain an eyesore long after the scrub and fern have become re-established. Kaingaroa State Forest fire-fighting organization, including the radio equipment, was fully and successfully tested in the fire, and valuable experience gained. The great value of the "Indian" hand-operated fire-fighting pumps coupled to a metal water-container carried over the shoulders was adequately demonstrated. A supply of these pumps is invaluable to loggers, millers, and forest owners and can be purchased from stocks held by the E.P.S. branch of the National Service Department. Other damage to scenic amenities occurred in Southland, where as a result of a very low summer rainfall two serious fires flared up in the Queenstown locality, doing some damage to scenic reserves.

Two points emerge from the Taupo and Wairakei fires, the most regrettable feature of which was that virtually all the damage which did occur could have been quite easily prevented by prompt suppression of the initial outbreaks. Unfortunately, however, no local body or other authority, &c., considered itself either responsible for or justified in dealing with the fires in their incipient stages. At Taupo the outbreaks were small local fires for several days before working up to sizeable proportions, and not till this occurred and house and other property were actually threatened was any action taken to control the outbreak. The only practical corrective is to see that such important localities are brought under the operations of the Forests Act and its Forest (Fire-prevention) Regulations. As the legislation now stands, however, this can be achieved only by some responsible body, firm, &c., applying to be created a forest fire district, whereas what are wanted are compulsory powers for the gazetting of forest fire districts wherever the fire hazard warrants their creation.

The destruction of 70 acres of exotic forest in the Taupo fire was no less regrettable from the fact that had the forest-owner taken his own appropriate protection measures the loss could have been avoided. More significant, however, is the fact that, even had this forest been in a forest fire district administered by another forest-owner or a local body as the original applicant for its creation, no power exists whereby the forest-owner could be compelled to take appropriate protective measures. This is seen in both State forest and private fire districts, where numerous forest-owners take little, if any, protective measures, leaving the administering authority to provide virtually the whole of the fire protection for the district. The principle of all forest-owners bearing an equitable share of the cost of forest protection in any area is widely recognized in most countries with a sound and progressive forest policy, and is advocated as essential to the adequate protection of both the dwindling indigenous forest resource and the expanding exotic resource.

During the same season a fire spread over 190 acres of the Guildford Estate, in Upper Hutt, endangering a local hospital; the estate plantations were, however, only slightly damaged; fire-fighting personnel was provided by the Army, and officers of this Service co-operated. Nelson had a very dry summer, numerous fires being reported in the vicinity of State forests: the largest fire was at Westhaven, where 200 acres of indigenous forest were destroyed. In Canterbury only one small fire occurred in State forest, although the season was the worst experienced for some years: a noticeable increase in the co-operation of the general public is recorded; the Canterbury Rural Fire Committees also functioned very meritoriously. In Southland the summer rainfall was very low; the two serious fires occurred in the Queenstown locality, endangering that town and doing some damage to scenic reserves.

Two causes of origin of forest fires not previously recorded in New Zealand have appeared during the year—namely, Verey light and tracer bullets. Verey lights were fired as signals from an aircraft, causing a grass fire near a Canterbury State forest. The fire was extinguished without damage by a forest patrol, who secured rapid assistance from the ground staff of a nearby aerodrome. The fact that it took nineteen men about a quarter of an hour to extinguish a fire caught in its very early stages shows the extreme danger arising from this cause in a bad season. During the same period a similar incident was alleged to have caused loss of grass pasture, fencing, pine plantation, and flax in Marlborough.

Late in the fire season a tracer bullet used by a deer-shooter set fire to a pine compartment in a State forest in the Rotorua district. These cases of known and certain origin are probably unavoidable in times of war in areas where troops are training, but they usefully illustrate how fires could arise in times of peace by negligent or illegal use of dangerous missiles. Administrative powers will be sought to regulate the use of such missiles throughout the Dominion in more normal times.

Two sawmills were destroyed by fire during the year, owned respectively by J. C. Malfroy and Co. (Westland) and Standard Timber Co. (Southland). In addition, a dry kiln and a considerable quantity of timber in Baigent's Mill at Berlin's was burnt, and the Egmont Box Co., Ltd. (Taranaki), also suffered fire damage.

44. *Fire Hazard and Lookout Stations, &c.*—The 1943–44 fire season was characterized by conditions of moderate hazard over fairly long periods in many localities. Short periods of very high hazard were much fewer than usual. Further study has been made of forest and tree mosses and liverworts as fire-hazard indicators, but their value is strictly limited, and this season's experience has again proved that measurements of relative humidity constitute the only reliable means of recording rapid changes from moderate to highly hazardous conditions. Local factors of wind direction and fuel types, however, are now proving of more significance and receiving more attention by observers.

Faulty location of fires by inaccurate intersectioning of lookout bearings was traced to improvised alidades and inaccurate maps, and corrective measures will be instituted as rapidly as staffing and equipment difficulties will permit. It is hoped to establish at least one new major and four minor lookout stations on Kaingaroa State Forest during the coming year.

For the first time in the history of the Forest Service a regular aeroplane patrol provided by the Royal New Zealand Air Force was used for detection and control of forest fires, on this occasion during the Taupo-Wairakei outbreak. On the initial patrol, fire was discovered in the incipient stage in the centre of a large area of indigenous forest, allowing of its suppression without any material damage, whereas without detection from the air there is little doubt that widespread damage would have resulted. So valuable did the experience prove that arrangements have been concluded for a regular air patrol over the Kaingaroa and adjacent forests throughout the next fire season.

45. *Fire Districts.*—One new district, known as "Woodhill-Helensville Fire District," was constituted at the request of the Public Works Department. The area is 20,800 acres, which brings the grand total to 64 with an area of 3,878,800 acres.

The outbreak of fire in the Guildford Fire District disclosed the fact that the administering authority had failed to provide adequate fire-fighting equipment, including transport, and it is clear that when the constitution of fire districts is brought under review as previously suggested in this report powers should be secured to compel administering authorities to take certain measures and provide sufficient equipment to give reasonable protection to their forests.

46. *Forest (Fire-prevention) Regulations 1940.*—No amendment to the regulations was made during the year, and administrative experience of the regulations—as amended early in 1943—during the 1943–44 fire season revealed no serious legal defect, and reports indicate that generally the provisions operated smoothly throughout the sawmilling industry. Although the widest possible publicity was given to the requirements of the regulations when they were issued, several cases of professed ignorance came under notice, particularly in respect to the obligations of persons employed in a State forest or in a fire district to do their utmost to suppress fires and to notify the nearest Forest Officer of any outbreak. In several instances outbreaks of fires were unknown to the Service until discovered by visiting forest officers, and it appeared evident that very little effort by workers in the locality at the time of the outbreak would have been necessary to subdue the fires in their incipient stages and thus prevent the burning-over of extensive areas. The neglect or indifference shown by workers in the past regarding forest fires must be stopped, and legal proceedings for a breach of the regulations are consequently taken in every such case detected.

With a view to removing any doubts regarding the personal responsibilities of workers, arrangements are being made for the regulations (incorporating amendments) and relevant fire provisions of the Forests Act, 1921–22, to be printed in poster form and for a copy to be displayed in every sawmill operating in a State forest or in a fire district. A leaflet directing attention to his lawful obligations is to be placed in the pay envelope of every worker affected at the beginning of the next fire season.

One other important feature of the regulations not yet fully appreciated is the fact that it is now the entire responsibility of the operator (not necessarily the owner) of an engine to see that it is fitted with safe and efficient means for preventing the escape of dangerous sparks, flame, or live coals, and that it is an offence for any person to operate an engine not so equipped. This provision is to be brought to the notice of operators, and another cause for a plea of ignorance will be removed.

47. *Animal Damage.*—No reports of particularly spectacular damage by game or fur animals have been received affecting State forests; but the amount of damage done continues at an undeniably high level. The number of men at the war and the scarcity of petrol and ammunition have plainly decreased the number of shootists killing deer and pigs, and complaints from farmers about deer depredations on farm-lands have increased. In State forests, however, with fewer areas in the young stage owing to decreased planting since the outbreak of the war and with annually larger areas in the thicket stage where deer do little or no damage, it cannot be held that damage has increased, although the deer population has undoubtedly done so. The movement of deer herds into thicket areas, where dense young forest provides harbourage with marginal grazing, is very noticeable, and in such areas of dense young coniferous forest over ten years of age shooting of the pest in numbers is extremely difficult. In Rotorua district a distinct movement of the Sambur deer from its previous areas into such good covert has been reported.

Similar increase in opossum numbers has been reported in Auckland in the vicinity of exotic stands of ten years upwards, and this conservancy, which some ten or fifteen years ago had few opossums, records 823 killed in State forests last year. Destruction of forest pests has, on the other hand, been assisted by the high price ruling for deer-skins for export (4s. 3d. to 5s. 6d. per pound) and by the high subsidy given by the Department of Agriculture for rabbit-skins.

Numbers of animals reported killed in State forests during the year are: rabbits and hares, 8,300 (14,600); deer (all species), 1,925 (627); pigs, 655 (502); goats, 55 (0); opossums, 2,302 (1,810). The large increase in the reported deer kill over last year was principally due to the results reported by two parties of Internal Affairs Department men in Kaingaroa and Blue Mountains State Forests.

48. *General Ecology.*—No special research was carried out, but marked increase in the incidence of fur and game animal pests in certain State forests has been referred to in the previous section.

49. *Insect Damage.*—No marked serious outbreaks of any insect pest have been reported, all station records dealing with normal seasonal occurrences of *Sirex*, *Hylastes*, *Pachycotes*, and *Navomorpha*. One report recorded that an alder break in Rotorua was

defoliated in late summer by *Pyronota festiva,* but, as this native beetle is almost polyphagous so far as broadleaved tree foliage is concerned, no special significance other than a local one attaches to the report.

50. *Damage by Fungi.*—There have been no serious outbreaks of disease reported in indigenous or exotic State forests during the year. Investigation of the pathology of the chief forest species in the field and during seasoning has been continued, and constant observation by forest officers is maintained. A survey of the effects in the sawn log of defects of silver-beech visible in the standing tree has been carried out, and heart rots of larch, insignis pine, and rimu, &c., have been investigated. Fungal diseases have caused minor losses at Ashley, Ermedale, and Waipoua nurseries. New host records include Australian mountain ash (raurimu) and American western red-cedar (erua) for *Armillaria mellea.* Herbarium specimens and typical cultures of many fungal species have been acquired.

51. *Damage from Natural Causes.*—The season was, on the whole, a favourable one, though far from being a normal one. Southland had the driest and finest summer for many years; mid-Canterbury experienced the heaviest snowfall recorded since the commencement of planting operations there; Wellington Province had several months of very low rainfall but of also comparatively low temperatures and high atmospheric humidity, which obviated excessive fire danger. Actual fire danger was most acute in Rotorua and Canterbury Conservancies, the special cases being narrated in previous paragraphs. On the whole, the season was excellent for tree growth in all parts, though there was localized damage of small acreages reported from storms and snow during July and August, 1943 (Riverhead-Karioi-Southland).

The super-excellent growth recorded during a very favourable season may not be without its drawbacks. A condition known colloquially as the " retarded leader " of insignis pine and certain other pines (the leading bud develops weakly or not at all, and a group of massive laterals outstrip it) has been familiar for many years as a regular but numerically insignificant condition. During the past season, widely separated stations have reported it as prevalent to a greater extent than usual—*e.g.,* Kaueranga, Kaingaroa, Ashley. The stands affected have made more than normal growth, but it is largely of this distorted nature. Careful counts made over a year at Ashley reveal that 40 per cent. of recently planted trees are so affected, the affected trees growing very freely and rankly, as might be expected in a good growing season, so much so that at Kaueranga in particular many well-rooted trees are falling over by their own weight. There is no cause for alarm as yet, nor is it intended to imply that the condition is of epidemic proportions; but it is recorded as being probably correlated in this instance with a growing season of better than average.

52. *Forest Offences.*—Offences against the Forests Act, 1921–22, and the Forest (Fire-prevention) Regulations 1940 show a considerable increase over those of the previous year, and convictions were secured in 40 cases (18), in which the total fines, costs, and damages imposed amounted to over £476. These offences comprise lighting of fires in State forests and fire districts without authority, failure to take adequate steps to prevent fire spreading, leaving fires unattended, failure to notify a forest officer of an outbreak, and operating a steam-engine not fitted with devices to prevent the escape of sparks, which accounted for 17 offences; cutting and removing timber from a State forest without authority, 13 offences; with entering a State forest and hunting without authority, 10 offences.

In one case of unlawfully lighting a fire the offender, in addition to payment of a fine and costs amounting to nearly £10, was ordered to pay expenses incurred by the Forest Service, exceeding £54, while in another case the offender was ordered to pay the sum of £154, the amount of the damage to the forest. Early in 1943 North Auckland had a period of particularly dangerous fire hazard, and several offenders who lit fires without authority were fined £15 each and costs.

In order to suppress unauthorized fire-lighting with attendant danger to State forests and unauthorized cutting and removal of forest produce, legal proceedings are instituted wherever practicable.

CHAPTER VII.—FOREST ENGINEERING

53. *General.*—Plant and man-power shortages have again created difficulties in satisfactorily maintaining existing services, and new construction work has been limited to bare essentials.

54. *Roads and Bridges.*—Existing roads have been maintained to the limit of available man-power and equipment. New roading has been chiefly for the extraction of kauri in the north for ship-building purposes, for the logging of insignis pine at Whakarewarewa, and for the extraction of saw logs from indigenous forest at Te Whaiti.

A summary of operations under this heading is as follows: new roads formed, 14 miles 26 chains; roads maintained, 794 miles; new tracks formed, 25 miles 48 chains; tracks maintained, 43 miles; new culverts, 60; culverts maintained, 18; drains maintained, 52 chains; bridges maintained, 29; new bridges, 4.

55. *Construction Equipment.*—In order to increase the mobility of angledozers in the Rotorua district, particularly for fire-fighting purposes, a tank transporter has been secured and located at Kaingaroa. Much of the earth-moving equipment used for the building and maintenance of both roads and firebreaks has completed its economic life, but is being kept in operation, although at considerable expense, until new equipment is available.

56. *Buildings.*—No new dwellings have been erected during the year, but additions at the Waipa Mill include a store-workshop extension and the saw-doctor's workshop, while the fire hazard at the mill has been reduced by completing the sprinkler system throughout the box-mill, dry kilns, dry-timber storage, and fuel-bins.

The inability to build houses for married employees at Waipa and Kaingaroa has been met by the adaptation of grouped huts. The amenities of the Kaingaroa settlement have been improved by the installation of septic tanks.

57. *Water-supply and Drainage.*—The heavy rains experienced at Rotorua and referred to in last year's annual report have again been experienced. The corrective measures then put in hand have, however, been effective in preventing a repetition of the flooding around the mill. Heavy rain at Te Whaiti caused an unprecedented flood which seriously damaged a private sawmill. The loss to the State Forest Service was, however, relatively small and confined to road damage. It was on this occasion that over 9 in. of rain fell at Pongakawa in twenty-four hours—the actual amount being unknown because the gauge overflowed.

In order to give more effective fire protection, an examination has been made of all surface indications of water on the Kaingaroa Plains with the object of creating water-storage at strategic points. This virtually waterless area presents a serious difficulty in providing fire-fighting facilities, and further mobile equipment is necessary in conjunction with the development of water-storage.

58. *Utilization Plant.*—The performance of the Waipa Sawmill during its third full year of working speaks for itself. The sawmill register shows that its production last year of over 9,000,000 board feet is more than three times that of the next largest insignis-pine mill. Its output is quite easily the most accurately sawn timber in the country, with 1 in. stock having a thickness variation of $\frac{1}{32}$ in., as compared with anything from $\frac{1}{8}$ in. to $\frac{3}{8}$ in. variation in circular insignis pine. Likewise, its kiln dryng yields the brightest and cleanest looking stock to be found in New Zealand and in startling contrast to the dirty, blue-stained product so characteristic of many other mills.

All these are both achievements and planned objectives. They are the result of painstaking study of the best sawmilling practices in the world and of the courage, enterprise, and perseverance of the Government and of Forest Service officers determined that the national forestry effort in establishing a huge and renewable resource of growing exotic timber shall not be frustrated and defeated by the application of its initial exploitation of archaic conversion practices as typified by lack of log sorting, by carriage sawing with either circular or band saws, or by log edging. For the sawing of small and/or knotty logs which the exotic forests must produce in overwhelming proportions for the next twenty years at least there is no known economic alternative to log-frame sawing of size-classified logs. That, at least, is the position in Northern Europe, with a timber-production one hundred times as large as that of New Zealand and with the necessity for competing on the world's markets not merely in respect to price, but as regards accuracy of sawing and brightness of appearance.

Still, in face of Waipa performance and irrefutable evidence from Northern Europe, there is a marked reluctance to accept the principle of log-sorting and frame sawing. Any alternative, indeed, appears acceptable, and yet not one such alternative has been advanced which was not considered and was not examined in some part of the world or other before the decision was taken to follow Northern European practice. What is more, Waipa experience during the last year has adapted the equipment to New Zealand's peculiar requirements. So rapid is the growth of insignis and other pines in much of the pumice country of the Rotorua Conservancy that up to 70 per cent. of the logs yielded by several species have a significant sweep in their length, so much so that if they are to be converted into sawn timber by circular or band-saw without excessive waste they must first be cross-cut into short 6 ft. to 12 ft. lengths, which, of course, much reduces the usefulness of the timber they produce. On the other hand, a method has been evolved at Waipa whereby this class of log goes through the first frame with its sweep in a vertical plane, yielding small slabs and side boards and a centre cant having side sweep. This cant is then sawn around the second frame, yielding a number of curved boards which are conditioned in the dry kilns to give perfect flattened stock. By this means small crooked logs which, by circular sawing, would yield only about 5½ board feet of short timber per cubic foot of log yield 6·6 board feet of long-length timber per cubic foot of log. The evolution of this sawing practice is a far-reaching contribution to the country's timber economy and, if not now, will some day be universally recognized as such.

Although designed originally for an annual production of only 6,000,000 board feet—a figure which was exceeded for the first full year's working of the plant—the mill has been called upon each subsequent year for a material increase in output in order to meet essential war requirements. The first increase was obtained by improved operation, but to secure the 9,149,000 board feet required last year it was necessary to supplement the log-frame equipment with a small circular-saw rig to work up all the very large and rough logs yielded by shelter-belts, marginal trees, &c. Again for the forthcoming year the demand for pine for war purposes is more acute than ever before and additional frame equipment originally secured for a mill in the Conical Hills State Forest has been installed with a view to increasing production to 11,000,000 board feet. In one four-week period already a production of 1,040,000 board feet has been attained. This is production. That small-log sawing and also kiln-drying costs are the lowest in New Zealand is efficiency.

The only other developmental work undertaken during the year consisted of trials with a bolt-sawing rig and an incising-machine. It has been found in thinning Corsican pine stands that "wolf" and double-leader trees often yielded too short a butt log to be dealt with either in the log frames or in the conventional type of Pacific carriage. After a study of the various types of equipment used abroad it was decided that the greatest promise attached to a bolting-machine in which the log is carried on a carriage gripped at its ends rather than at one side. A representative rig was duly obtained, and while successful trials with Corsican pine have been instituted, the machine has proved even more useful for the

working-up of mine timbers from short bolts of various eucalypts, and its economies for both purposes are under further study.

The purpose of the incising-machine has been to secure deep penetration of creosote in the heartwood of insignis pine, which is quite resistant to ready absorption of the preservative. The machine has proved capable of giving the desired results, and will be used for the incising of sufficient railway sleepers to lay down service-test tracks several miles in length. The incising is done by sharpened steel lugs projecting from a roller which feeds the timber lengthwise through the machine.

The establishment of a saw-doctor's training school fully equipped for the instruction of operatives in both State and private employment, including returned servicemen desirous of acquiring proficiency in this difficult and, to the timber industry, essential art, gives promise of the permanent removal of past disabilities occasioned by shortages of such skill. An expert instructor is in charge of the school, and he has already under tuition a full complement of trainees. The opportunity is also offered of refresher courses for those in industry whose employers are agreeable to make the necessary arrangements.

59. *Transportation.*—In all, twenty-two slightly used vehicles released from the Army Department were purchased by the Service to replace completely worn out units. Of this number, sixteen were placed in the Rotorua region, two in Canterbury, and four in Southland. In addition, three two-berth Army ambulances, fully equipped, were purchased and stationed one each at Kaingaroa, Te Whaiti, and National Park for the purpose of providing immediate transportation in case of accident and sickness among forest and sawmill workers and their dependants.

Three new tractors were purchased and have been placed in operation at Te Whaiti and Waipa. Four Freuhauf heavy-duty logging trailers were put into operation at Waipa. Their introduction has greatly facilitated the supply of logs necessary to maintain the increased output of timber at the Waipa Mill, the equipment having handled loads up to 18 tons without damage to either vehicles or roads.

The increased transportation of timber between the Waipa Mill and the railway-station at Rotorua has been effectively handled by a fleet of six detachable semi-trailers and only one powered vehicle. With these a shuttle service is operated by taking a loaded semi-trailer from the mill to the railway-station, returning with an empty trailer, and picking up another loaded one at the mill. A continuous delivery of approximately 30,000 board feet per day is maintained by this system and is indicative of the economy that could be obtained by its use wherever possible in the industry.

60. *Communications.*—Nine miles of new telephone-line were erected, bringing the total in use to 398 miles. Two miles of earth circuit were converted to metallic. The radio communications system at Kaingaroa Forest functioned satisfactorily, except that the aerial at the new regional headquarters in Rotorua will require shifting to a new site if best receiving and transmitting results are to be attained. By means of portable sets, reconnoitring officers and fire-fighting personnel engaged in the Taupo-Wairakei locality were able to maintain direct contact with Kaingaroa Forest headquarters and arrange for the supply of such equipment and men as were required to bring the large outbreak there under control. It is proposed to further develop the radio network by equipping major lookout stations and installing the necessary equipment to allow of radio communication with the aircraft patrol which is to be provided next fire season.

61. *Village Planning.*—The greatly increased production required from the Whakarewarewa State Forest for war purposes rendered imperative the immediate provision of extra accommodation for married workers in the vicinity of the Waipa Mill, and this has been met by the construction of ten temporary dwellings formed by joining up standard hutments and providing verandas, kitchens, and bathrooms, and other amenities. These dwellings will be replaced by more substantial types as soon as conditions permit. In the meantime they have secured to the mill the services of a number of operatives who could not otherwise have accepted employment.

Surveys have been made and areas selected for establishing forest communities at Te Whaiti, Reporoa, and Waiotapu, and the Green Lake, as well as in Rotorua itself, in order to meet the most urgent needs for accommodation of Forest Service personnel required there.

CHAPTER VIII.—EXTRACTION AND COMMERCIAL DEVELOPMENT

62. *State Forest Block Sales and Permits.*—Timber appraisals numbered 131 (130) covering 115,025,000 board feet (101,460,000 board feet), of which 32 (42) comprising 25,155,000 board feet (23,009,400 board feet) were carried out on behalf of other Departments. Forest reconnaissance was carried out over 3,240 acres (15,700 acres) affecting 24,307,000 board feet (67,000,000 board feet). No Head Office check appraisals were made, but in each conservancy various check appraisals were carried out by the Conservator or Senior Ranger.

The increased wartime demand for forest-produce continued. The volume sold in board feet was 86,200,900 (74,710,000), the chief species being rimu and miro 73,172,400 board feet, kahikatea 3,875,600 board feet, matai 2,303,600 board feet, totara 1,074,300 board feet, beech 3,536,100 board feet, tawa 831,000 board feet, and other species 1,407,900 board feet at a value of £116,177 10s. (£103,413).

The quantity of sawn timber produced from State forest and Warden areas was 106,711,400 board feet (111,190,000 board feet), miscellaneous indigenous-forest produce cut under permit comprised 217,111 posts and stakes, 5,048 stays, 14,658 strainers, 113,793 battens, 773 poles, 10,860 rail and tram sleepers, 10,690 house and pole blocks, 120,637 pieces of mining timber, and 635½ cords of firewood. The produce cut from exotic forests included 30,000 pieces of mining timber (13,960).

63. *State Forest Logs.*—State forest log sales aggregated in volume 1,662,580 cubic feet (1,451,247 cubic feet) with a sale value of £69,485 (£51,053), a proportion of which were sold for peeler purposes. Sales of indigenous logs were confined to the Auckland and Rotorua Conservancies. In the latter considerable minor produce was obtained from cut-over areas, including 48,292 posts and stakes, 270 strainers, 60 house blocks, and 60 cords of firewood.

Log sales were made from exotic forests in Rotorua and Southland, the total quantity being 1,588,400 cubic feet (1,293,638 cubic feet), the major portion of which was converted at Waipa Mill. A large quantity of miscellaneous produce was also extracted and sold from the exotic forests—viz., 135,130 posts and stakes, 907 strainers, 6 stays, 7,638 poles, 1,541 rails, 11,825 battens, 247,610 pieces of mining timber, and 6,184 cords of firewood. Round timber for creosoting aggregated 244,820 cubic feet (118,007 cubic feet).

64. *Indigenous Timber Disposal.*—Developments during the year have brought into sharp focus a number of disquieting tendencies in the timber trade. During the depths of the 1930–35 depression the Government agreed to confine sales of State forest timber to sawmilling undertakings already in existence. With production and capacity much in excess of demand over the 1932–41 period, this policy was logically sound, and its continuance up to the present has likewise been justified in the interests of man-power conservation.

Such a policy, however, of protecting vested interests, particularly over such a long period, is dangerous and undemocratic, dangerous because it tends to stultify progress, and undemocratic because it denies opportunities to new and progressive individuals and firms for engaging in the timber trade. This danger had been appreciated even prior to the war, and there is little doubt, except for the intervention of the present conflict, the depression policy of protecting established interests would have been abandoned several years ago.

The inate conservatism of the industry, due in part to the protection of established interests over the last twelve years, could not be better exemplified than in its reluctance to benefit from the experience gained in the Waipa operation and to adopt log classification and log-frame sawing of small exotic logs as referred to on page 15, paragraph 69, of this Chapter. *Inter alia*, one of the major objectives of this operation, all of which have been achieved, was the maximum production of sawn timber from each cubic foot of round log supplied to the mill. The gravest indictment both of the industry and of private exotic-forest owners which has come under the notice of the Department for several years has been the view expressed by some of their representatives that the Forest Service has been making a fetish of high conversion rates—that is, of reducing waste and conserving the country's forest resources. Fortunately, many sawmillers realize the necessity for reducing waste, and appreciate the Forest Service's efforts to demonstrate practical ways and means of achieving this objective.

With additional man-power now becoming available by way both of rehabilitation and of volunteers from the Pacific theatre of war, and the urgency of increasing timber-production both immediately and for the post-war period, abandonment of the depression policy of protecting established interests has become a vital war and rehabilitation necessity. Freedom for new operators, particularly returned men with practical and managerial experience, to compete for State forest timber will undoubtedly assist to revitalize the industry.

Most significant over the past year have been persistent representations by group interests involving the excessive tying up of timber resources. Without appreciating exactly where the pressure originates, the industry itself has lent its support to this development by a claim for so-called "security of tenure," the majority of operators apparently not appreciating that for the Forest Service to give away to current tactics would only be at their own expense and deprive them of future participation in State forest indigenous resources.

Actually, the great majority of millers operating on State forest throughout New Zealand know that over the whole period of its existence the Forest Service has afforded them continuity of tenure wherever practicable. True, it has consistently refused to recommend the formal tying up of tributary and reserve areas, but this has been necessary in order to prevent aggregation of timber resources through such devices as dummy mills, &c., to avoid trafficking in forest resources, and to preserve to the State any unearned increment in State timber. Instead, where mills have been working on State forest, the Service has agreed to withhold from sale such timber as may be logically and economically workable to each mill and, so long as performance of obligations is satisfactory, not to introduce any new mill. With two mills already established on one forest area, it has further been held to be fair and just that, other things being equal, where one of these mills is a group interest and the other an individual mill, this latter should be favoured in respect to the allocation of residual or final areas as the forest approaches the end of its cutting.

The new demand for security of tenure, or for a long cutting life as will be better understood, arises out of the fact that quite a few mills are cutting out on private- and Native-owned forests, and group interests with their strong financial resources therefore seek new supplies from State forest. There are two serious aspects to this development. The first is that often group interests already have substantial resources of either private- or Native-owned timber. One major group has at least 185,000,000 board feet, if not much more, including one block of between 30,000,000 board feet and 40,000,000 board feet upon which no mill is operating. Yet for one of the mills within this group persistent representations are now being made for the granting of "security of tenure," or, say,

sufficient timber for twenty years' operation. The Forest Service contends that the proper action meantime is for this mill to be transferred to the privately controlled block already referred to.

Another serious aspect is exemplified by the operations within this same group over recent years. Prior to the war one of its units purchased two mills both with a limited life on State forests, and over the last two years still another two mills with even shorter lives. In the first case the Government took the precaution of agreeing to the transfer of the State forest attached to the two mills only on condition that it did not strengthen the hands of the group interest for further State forest, but this was not possible in the second case owing to the fact that they had not been established on State forest. Nevertheless, persistent representations for security of tenure, not only for these four mills but for another four which it also owns, are now being made to the Forest Service.

With supplies of indigenous timber dwindling rapidly, it is obvious that if the Forest Service is to continue its policy of continuity of cutting, especially in opening up new major forest areas and ensuring mills of twenty years' supply of standing timber or logs wherever practicable, it will be necessary sooner or later to adopt a policy that no one group or individual shall possess more than one such area or supply, whether this be State, private, or Native owned. Only by this means can the majority of individual operators be assured of participation in the future production of the country's indigenous timber requirements. An attempt to allay the fears of small millers in this respect has been made by the determined advocacy of the industry for the adoption of small indigenous-type mills in all exotic forests, but as reviewed on page 15, paragraph 69, of this Chapter, while quite small mills are economic in the indigenous forests, only very large mills will be economic in the major exotic forests. It is therefore logical to favour, wherever practicable and economic, the installation of as many small mills with a reasonably long life in the indigenous forests and, conversely and complementally, the erection of large log-frame mills in the major exotic forests and of small log-frame mills in small exotic forests. This is the essence of Forest Service and timber-sales policy, and only by such an arrangement can both the public interest and that of the great majority of the millers be safeguarded. Such a policy, it will be observed, even provides a place for reasonable functioning of the group interests which, with their strong financial resources, are logically able to operate the very large log-frame mills which must be erected to economically convert the country's exotic-log resources.

In fairness to the group interests it is pertinent to place on record an appreciation of the fact that, particularly in the North Island, where the demand for timber has been so very acute, these interests have been outstanding in their contribution to timber-production and in their co-operation with the Office of the Timber Controller.

65. *Whakarewarewa State Forest Production.*—The clear-felling of the older compartments planted in insignis pine was continued during the year, and the thinning of both Corsican pine and European larch compartments was carried out to the maximum extent allowed by the limited labour available. Thinnings suitable for sawing are supplied to the Waipa Mill, and the balance sold for mine props or utilized for the production of creosoted fence-posts. The working plan as originally drawn up for the Whakarewarewa Forest provided for a sawlog supply of only 800,000 cubic feet per annum, but during the past two years, and as a war measure, it has been found necessary to considerably overcut the forest, and for the current year and at least the duration of the war approximately twice the prescribed quantity of logs must be cut. Obviously, as soon as possible a reduction to working-plan prescription must be undertaken.

During the period when charcoal-production for motor fuel was at its peak, the opportunity was taken of cutting out poorer eucalypt stands and replanting with pines. This policy is being continued as far as is possible, and the timber removed disposed of for firewood, mining purposes, &c. In addition, underplanting of other eucalypt areas with macrocarpa and pines has been undertaken.

Soon after the entry of Japan into the war a heavy thinning of the larch plantations was undertaken to provide material for poles, stakes, &c., as well as for air-raid shelter and protection, for which it was particularly suitable. In addition to the sizes and lengths called for, timber principally in small diameters was also incidentally produced, but could not be marketed at the time owing to shortage of man-power. With a marked falling off in demand for larch for war purposes, the opportunity was taken, as labour could be spared, of collecting this incidental production. It has found a ready market as firewood.

Clear-felled insignis-pine logs as delivered to the Waipa Mill cost 10s. 5d. per 100 board feet of mill production, as compared with 9s. 10d. for last year. Both figures include a payment to the Whakarewarewa Forest Account of a stumpage of 2s. 6d. per 100 board feet to meet growing costs. The increase is due to logging smaller trees.

66. *Waipa Milling Operations.*—In order to meet an urgent demand by the Office of the Timber Controller for increased production, a circular-saw head-rig with Pacific-type carriage was incorporated into the Waipa layout towards the middle of the year and operated for 117 days, as against the Waipa log-frame record of 269 days. Still later a third log frame was installed to increase further production during 1944–45.

The production of sawn timber by the Waipa log frames again increased, and a new peak of 8,272,000 board feet (7,696,000 board feet) was recorded. The circular rig, which worked intermittently during the latter half of the year, cut 872,000 board feet, bringing the total output in sawn timber up to 9,144,000 board feet. The logs sawn at the plant comprised insignis pine (77 per cent.) larch (7 per cent.), and other species—principally Corsican pine—(16 per cent.).

The demand for general and export containers was sufficient to have allowed the Waipa box-factory to absorb the entire output of the sawmill, but at the request of the Office of the Timber Controller 1,356,000 board feet (2,182,000 board feet) were sold to other manufacturers for the construction of special munitions containers, &c.

At 31st March, 1944, the Waipa stocks were 1,740,000 board feet (1,853,000 board feet). Timber filleted for kiln drying totalled 5,320,000 board feet and for air drying 2,372,000 board feet. The balance of 1,452,000 board feet was sold or used in a green condition. The dry kilns conditioned 5,354,000 board feet, of which 4,877,000 board feet consisted of green timber and 477,000 board feet partially air-seasoned. The kiln-drying costs, amounting to only 3s. 5d. per 100 board feet, are by far the lowest in New Zealand. Dipping to prevent sap-stain in air-seasoned stock was discontinued during the year owing to the prevalence of dermatitis amongst the men handling the dipped timber. A deterioration in the quality of air-seasoned timber has undoubtedly resulted, but will shortly be corrected by the wider use of kiln drying and by the dipping of the timber after it has been filleted in unit packages instead of before, thus eliminating any handling of the dipped boards.

The profit earned by the sawmill and dry kilns amounted to £12,276, as compared with £9,822 for last year.

67. *Waipa Box-factory and Planing-mill.*—During the year the box-factory converted 7,763,000 board feet of exotic softwood into box shooks, representing a 77-per-cent. increase on the previous period's record of 4,380,000 board feet. Manufacture was largely confined to export containers, amongst which were 100,000 cheese-crates, 297,000 meat-cases, 99,000 biscuit-cases, 10,000 boot-cases, 181,000 raw-vegetable cases, 141,000 dehydrated-vegetable and tinned-fruit cases, 125,000 barbed-wire reels, 79,000 nail-cases, 19,000 bacon-cases, and 23,000 oatmeal-cases. In addition, 47,000 fruit-cases and 5,000 miscellaneous cases were made, and 86,000 board feet of timber dressed for special purposes. The box-factory operations show a profit of £15,384 for the period, as compared with £5,402 for last year. In the case of both sawmill and box-factory, extra depreciation has been provided for to cover the abnormally large production achieved during the year.

68. *Departmental Wood-preserving Activities.*—Full-time output from the Rotorua creosoting plant was not obtained owing to an insufficiency of seasoned stocks—a deficiency brought about by an earlier diversion of labour to the urgent production of defence requirements—but with stocks now being replenished an increased output is anticipated for the current year. Production from the plants at Hanmer and Conical Hills was maintained at a satisfactory level. The year's operations are summarized in Appendix III. The demand for creosoted posts from Rotorua has greatly exceeded the plant's capacity to supply, and regular customers have been rationed as equitably as possible, although latterly rail restrictions have prevented the fulfilment of orders.

69. *Exotic-forest Exploitation.*—"There is a tide in the affairs of men which taken at the flood leads on to fortune." This is just such a critical period as exists in the exploitation of the Dominion's exotic-forest resources. Annual reports of the Department have emphasized for many years that with the pending commencement of exotic-forest cropping it was imperative that the cardinal error be avoided of perpetuating the indigenous type of sawmill in converting the exotic logs into sawn timber. Already the use of this type of equipment in working up shelter-belt and woodlot exotics had perpetuated the inaccurate sawing and subsequent abuse in storage and drying so characteristic of much of the indigenous timber, and strongly prejudiced many users both in New Zealand and Australia against the locally grown exotic softwoods.

In the profound belief that it must correct this position before any large-scale production eventuated, the Government as guardian of the national forest policy, and as the result of a world-wide investigation into conversion practices of all kinds, established the log-frame sawmill at Waipa. Its major objective was fourfold:—

(*a*) The principle of sorting logs according to their diameters, &c., and of sawing each group on a mass-production basis as practised in both Northern and Eastern Europe promised such economies that it was vital to study the practical adaptation of Scandinavian equipment to the working-up of New Zealand-grown exotic logs:

(*b*) Owing to the high cost of producing small-diameter logs, it was essential to reduce waste to a minimum and secure the largest possible yield of sawn timber per cubic foot of log:

(*c*) The timber should be so accurately sawn that it could be machined and fabricated with a minimum of waste in wood-using factories:

(*d*) The timber should be so well dried and merchandised that it could compete on a quality basis with other timbers imported into both New Zealand and Australia, and used as substitutes in both countries for building as well as for boxmaking, &c.

Not only have all four objectives been attained, but the all-important proof of economic operation at existing price levels has been established beyond all possible doubt. *Seriatim* it has been discovered that, due to the large number of logs "with sweep"—that is, which are bent or out of the straight—amounting to between 50 per cent. and 70 per cent. according to species and site, the log frames are ideally suited to their conversion, although involving sawing practices not usually employed with this type of equipment. For this reason the usual recovery by circular sawing of long-length timber per cubic foot of log has been increased by 20 per cent. and waste reduced accordingly. The true significance of these two successfully achieved objectives can best be judged by considering that if the

800,000 acres of exotic forest in New Zealand were ultimately to average a mean annual increment of 100 cubic feet per acre, the annual yield of logs, amounting to 80,000,000 cubic feet, would produce by log frames over 530,000,000 board feet of sawn timber, but only 430,000,000 board feet if converted by the usual type of circular-sawing equipment; or, expressed in another way, circular sawing, if adopted, would be equivalent in avoidable waste to burning or otherwise losing 160,000 acres of our exotic-forest resource.

The Forest Service is confident that the public will not be a party to such rank wastage of its assets, and yet it has been this type of equipment that has been strongly advocated by many in the industry. Not one of these has publicly accepted the basic principles of log classification and log-frame sawing, the sole concession—and this only by implication—that there is some merit in frame sawing being that deal frames are now advocated for use with circular-saw head-rigs.

That the accuracy of the Waipa log-frame sawing is much superior to circular sawing is well evidenced by the attestation of one boxmaker that from each LA rail truck of Waipa timber he obtains only two bags of planer shavings, as compared with twelve bags from the same quantity of circular-sawn timber. More convincing still are the results of trial shipments of over 1,000,000 board feet of Waipa timber to Australia. The Forest Service, confident in the belief that its timber was worth more than any other locally produced exotic softwoods, would not sell in Australia at a premium of less than 3s. per 100 board feet on ruling prices. The buyers' experience and advice were that, due to the accuracy of sawing and drying and the trimming and branding of the timber—

(*a*) It was worth a premium of 6s. per 100 board feet;

(*b*) Wastage in use was only 3 per cent., as compared with anything from 13 per cent. to 20 per cent. for other locally grown insignis-pine timber;

(*c*) It was better sawn and merchandised than any North American timber, and equal in these respects to the best Scandinavian timber; and

(*d*) Under no circumstances should the New Zealand Government allow any exotic softwood to be exported from the Dominion unless equal in all respects to these Waipa shipments.

These facts, it is believed, speak for themselves, and the Forest Service is justifiably proud of having discharged so successfully to all concerned its first duty of demonstrating the physical possibility of high-quality production by log classification and log-frame sawing. That a reasonably good profit has also been earned at existing price levels is of special significance, since by the reduction in milling waste, the State Forest, and therefore the public, revenues will ultimately be increased by £60,000 annually. Exotic-forest owners may also effect similar increased realizations to the extent of one-fifth of the stumpage rates based on sales to circular-saw mills.

Nevertheless, Waipa is only the first step in demonstrating the true value of the country's exotic resources. Now that operating experience with log frames has been obtained, the next step is to demonstrate economic operation on a large scale. A three-line production mill with an annual cut of 20,000,000 board feet has been designed as the smallest balanced unit capable of handling all classes of logs efficiently and producing timber at a reasonably low cost by the mechanization both of sorting-table operations and of the stacking and unstacking of timber for kiln-drying, both distinct improvements on the already efficient operations at Waipa.

The major objective is to effect a reduction on current Waipa costs of 3s. 6d. per 100 board feet not with a view to increasing stumpage, but to reduce the selling-price of timber for domestic consumption and allow it to be sold more widely in Australia, which is capable of absorbing probably twice as much exotic softwood as the local markets. The nominated reduction is regarded as the absolute minimum required to create and maintain any large volume demand from Australia, and even this is premised on substantial reductions in both rail and sea freights. It is therefore imperative that the Forest Service, with so much at stake, should proceed with this further demonstration. It is a vital national project similar to those found essential in the forest countries of North and Eastern Europe, where most major forest areas owned by the various Governments carry such a State mill as a key control unit to ensure that not only does the Government receive full value for its stumpage by reduction of wastage, &c., but that high-class products are manufactured and export markets properly developed and serviced. To ignore the experience of these countries would be extremely dangerous as well as disastrous to the public revenues and to the future of exotic forestry in New Zealand.

The industry unfortunately appears to have lacked such vision and for this reason has advocated small mills premised on current price levels. Opposition to large units is perhaps natural to the industry owing to the failure of even moderately large units in indigenous timber. On the other hand, reference has already been made in a preceding paragraph to the fact that opposition appears to spring from a desire to see as many small operators as possible established in the exotic forests.

Failure to charge the Forest Service with the responsibility for a further demonstration unit will be a national calamity in New Zealand forest history. By its successful and profitable operation of the Waipa Mill the Department has proven its enterprise, its courage, and its resourcefulness. It is the only organization in the country with any practical knowledge and experience of log-frame operation on a large scale, and it is sound public policy that it should pursue with all expedition its plans for exploring the economics of large-scale production and developing the export markets. The fact that a Government Department is carrying out this activity should be ignored. The stakes at issue are so profoundly important that they should transcend all political considerations, particularly as both the Government and the Forest Service have repeatedly announced that it is

their desire to limit participation in sawmilling to the extent of erecting and operating only demonstration and key mills such as these herein reviewed. At no time has it been visualized that Forest Service mills would ever produce in total more than 10 per cent. of the annual cut of indigenous and exotic timber, leaving to private enterprise the remaining 90 per cent. That private enterprise will rise to the occasion the Department is confident, believing that eventually the industry will appreciate that it has been saved many hundreds of thousands of pounds in undirected and unplanned experimentation and that departmental milling policy is as much in the industry's as the public interest. The Forest Service believes that it has made an unanswerable case for log classification and log-frame sawing in large mills wherever the forest resources are sufficiently large to maintain them, elsewhere in smaller mills, of which there will ultimately be quite a few, attached to the numerous small exotic forests already established or soon to be created in various timberless districts throughout the Dominion.

An adverse decision means—

(*a*) Inferior timber at high prices:
(*b*) Restricted domestic and export markets:
(*c*) Stagnating exotic-forest resources:
(*d*) No further forestation:
(*e*) Languishing forest industries.

The Forest Service alternative means—

(*a*) High-quality timber at low prices:
(*b*) Large domestic and export markets:
(*c*) Healthy, well-managed exotic-forest resources:
(*d*) More forestation:
(*e*) Strong and prosperous forest industries.

"There is a tide in the affairs of men which taken at the flood leads on to fortune."

CHAPTER IX.—TIMBER TRADE

70. *Production of Sawn Timber.*—The annual cut of sawn timber reported by the Government Statistician for the year ended 31st March, 1943, was 342,000,000 board feet (see Appendix VII), against an estimated figure of 350,000,000 board feet, the deficiency being due to a smaller accession of general and skilled personnel by release from the Armed Services than was anticipated. A production of 345,000,000 board feet for the year ended 31st March, 1944, is indicated by the last sawmill registrations, falling slightly below estimate owing to a further deterioration in the man-power situation. With the recent release, however, of a substantial number of men from the Pacific theatre of war for service in the timber industry, a material improvement in timber-production is assured, and an annual cut of 350,000,000 board feet is confidently anticipated for the year ending 31st March, 1945.

71. *Species cut.*—With the exception of kahikatea (or white-pine), in which the cut decreased by over 5,000,000 board feet to 24,357,000 board feet, production of all other important species was larger for the year ended 31st March, 1943, than during the previous year. A new peak was recorded for insignis pine, the production of which increased by over 11,000,000 board feet to 67,000,000 board feet. While the production of the building timbers—rimu, matai, and totara—as a group increased by over 8,000,000 board feet to 230,000,000 board feet, it should be noted that the total quantity actually available for building was lower owing to the enforced usage of rimu and matai for butter-boxes and cheese-crates in order to meet the deficiency in kahikatea supplies.

72. *Man-power.*—Despite constant efforts to effect an improvement, the shortage of man-power within the industry was a major problem throughout the year. In the early part of the period additional withdrawals for the Armed Forces and normal wastage caused serious concern, but return of the Forestry Units from Great Britain and of men from the Middle East, together with a number of releases from the Armed Forces within New Zealand, assisted materially in restoring the position during the last two or three months. A detailed man-power survey was made in September, 1943, to ascertain the requirements of sawmills in order to obtain the maximum possible production on a forty-eight-hour-week basis, as a result of which vacancies for 1,300 extra men were required, or approximately 25 per cent. of the existing complement, the survey also indicating that the acquisition of this number of extra workmen would give a still greater percentage increase in production.

The continued transfer of semi-skilled and inexperienced workers from other industries to replace men withdrawn from forest and mill operations for service overseas has thrown heavy responsibilities upon the remaining skilled personnel, but even this fact did not prevent production from being maintained at a high level, and every worker in the industry is entitled to great praise for such an outstanding effort. Unfortunately, this splendid performance could only be effected by deferring development work for future operations, and forward extension of trams and roads into new areas of bush will require extra labour in the coming years.

Training of workers to become skilled operatives has been another problem during the past year. The State Forest Service and the New Zealand Railways, in seeking a solution of their own problems, have commenced to furnish a limited number of selected men with tuition in saw-doctoring at the Waipa Mill. These men are being trained to undertake this work in various mills throughout the country, and it is hoped to extend the scheme later to cover a much wider field of sawmilling activities.

Additional reference to the man-power position will be found on page 25, paragraph 102 (Chapter XII).

73. *Equipment for Timber and Allied Industries.*—Limited deliveries of new equipment for logging operations, sawmills, and box-factories have helped in relieving the strain on the resources of the industry, but the quantity is still insufficient to avoid serious and prolonged interruptions to production. Worn-out plant which would have been discarded in ordinary circumstances must still be used. As must be expected, operation of this old equipment is taxing the resource and ingenuity of all millers who must be complimented on the way they have solved their problems in this respect.

Logging equipment is causing the gravest concern, due to the large number of tractors which the industry is compelled to maintain on productive work long after their economic life has been passed. Through repeated efforts to secure replacement of these machines, ten imported tractors were made available to the industry during the past twelve months, but these fall far short of minimum requirements, and if production is even to be maintained, let alone increased, an additional eighteen heavy tractors complete with blades and winches must be made available within the next twelve months. Failure to supply blades and winches, &c., on the machines recently imported caused some inconvenience until suitable equipment was located within the country, and it is imperative that these accessories be supplied with future deliveries of tractors for use in the industry.

The increased road haulage of logs has resulted in much improvization of trailers constructed from material available in the country. The axles, wheels, and tires of these single- or double-axle units have been in many instances inadequate for the work to be done, and frequent repairs were necessary to maintain production. Emphasis must be placed on the desirability of designing and constructing rugged trailer equipment capable of carrying the heavy loads involved in log haulage.

Messrs. Henderson and Pollard, Ltd., Auckland, have commmenced operating their new veneer and plywood factory, and although full production has not been achieved, the output has assisted in meeting heavy current demands for plywood. The most interesting development of the year was the installation by Messrs. N.Z. Plywoods, Ltd., of a hot press for the production of resin-bonded plywood.

74. *Domestic Markets.*—Although the demand for timber for defence works in the Dominion and in the South Pacific war theatre decreased during the year, expansion of hospital and Air Force construction served to maintain timber-consumption at a high level. For the second year in succession continued efforts by the Office of the Timber Controller to have construction reduced to virtually the level of current production and thereby avoid undue depletion of stocks proved unavailing, with the result that when, for the first time since the entry of Japan into the war, housing came into prominence, the building industry, particularly in the North Island, reported on numerous occasions that programmes were being restricted by timber shortages and that individual builders were embarrassed by the difficulty of arranging a sufficient continuity of timber-supply to keep their labour fully employed. Had timber stocks been maintained at even 75 per cent. of pre-war levels, none of these difficulties would have been experienced.

There is no doubt that, in building-timbers, demand and supply in the North Island are out of equilibrium. To meet shortages of normal casemaking woods, rimu is being used to an appreciable and increasing extent. Primary producers are calling for abnormal quantities of timber not only for deferred and current maintenance, but also for the erection of new buildings and houses needed for increased production; local bodies, faced with deferred maintenance of bridges, &c., and unable to secure Australian hardwoods, are using rimu, matai, and totara in significant quantities; furniture-manufacturers, no longer able to obtain oak, &c., and veneers from overseas, are virtually confined to the use of rimu; urgent deliveries of South Island rimu approximate only one-third of normal, due to shipping shortages and bar-harbour difficulties, and the forward position in respect to both is far from reassuring; and lastly, stocks of building-timbers at less than 25 per cent. of their pre-war level render a satisfactory service virtually impossible and subject the wood-consuming industries to all fluctuations in deliveries occasioned by the intermittent transport shortages, bad weather, &c.

The position has been a difficult one for all wood-users, but more so for the building industry. A shortage of bricks and bricklayers has led to weatherboard houses being built to an increasing extent, and scarcity of more permanent materials has resulted in schools, hospitals, &c., being constructed in wood. For these buildings and for house-construction the grades of timber normally used include only a limited proportion of the log run of the indigenous building-timbers, but, what is even more serious, the grades usually acceptable are out of balance with their relative occurrence in the log. The disequilibrium is greatest in dressing heart grades, in which production averages only 10 per cent., whereas demand in the form of weatherboarding, flooring, joinery, &c., totals over 30 per cent. As disclosed in Chapter XII, this unbalanced demand was corrected by the Office of the Timber Controller, which arranged, by negotiation with the appropriate authorities, for the acceptance of various grades and qualities alternative to those normally specified and used.

The large expansion in kiln installation referred to elsewhere also enabled the wood-consuming industries in Auckland and Wellington to obtain the maximum service possible from the restricted supplies of dressing grades which have been available. Chaotic conditions with certain unemployment must have resulted in both cities if the timber trade had failed to increase kiln capacity. Its action has been the salvation of most users for whom thoroughly seasoned timber is essential.

The demand for timber for containers was maintained at a high level, and on numerous occasions local shortages occurred principally in those needed for the export of cheese,

bacon, nails, boots, clothing, and tinned foodstuffs. To meet the demand it was necessary to draw large quantities of case shooks from the South Island for North Island packers, and at the present time virtually the entire capacity of South Island box-factories surplus to local needs is being shipped to the North Island. Throughout the North Island, box-factory stocks are consistently subnormal and unsatisfactory, rendering it difficult to manufacture boxes from timber of the requisite dryness.

Prices of indigenous building-timbers, both wholesale and retail, remained unchanged throughout the year. To maintain the production of insignis pine, which was and still is essential to the maintenance of New Zealand's abnormal export programme for foodstuffs and munitions, the Price Tribunal granted increases in a number of instances to sawmillers who were able to establish to its satisfaction that increased costs beyond their control had resulted in current approved prices becoming uneconomic. Such increases generally resulted from higher log costs, occasioned by the necessity of securing logs from farther afield.

75. *Timber Imports.*—As disclosed by Appendix IV, total imports for the year 1943, principally from Australia, Canada, and the United States, amounted to 14,714,000 board feet. Of the 9,774,000 board feet of hardwoods received from Australia, 148,722 sleepers accounted for 3,470,000 board feet. Export of hardwoods from Australia remains under strict permit control, and all orders for essential requirements are passed through the Office of the Timber Controller to the New Zealand Supply Liaison Officer in Sydney, who places the order as directed by the Commonwealth Timber Controller. Freight space from Australia continues to be in very short supply, especially from minor ports. Only occasional loadings are available from West Australia, and then only to eastern ports, thus involving extra costs of transhipment, &c. Of the 3,539,000 board feet of Douglas fir received from Canada, by far the greater portion was merchantable grade suitable only for heavy constructional work and ship repairs. Fairly regular shipments have been available throughout the year, but specifications have had to be amended in accordance with available supplies in Canada. Clear grade has been in short supply owing to the heavy demand in both North America and Great Britain, with the result that local industries requiring clear Douglas fir have been compelled in some cases to accept inferior substitutes. Redwood importations from the United States amounted to 1,364,000 board feet and served to supplement local supplies of totara, particularly for the production of joinery for housing and hospital buildings. Of other timbers imported, amounting to 37,000 board feet, the principal item was sugar-pine from the United States. This wood is used almost exclusively for engineers' pattern making, and supply was difficult to arrange; it was necessary to accept sizes not quite in accordance with those usually imported.

76. *Timber Exports.*—The reduction in exports from 7,500,000 board feet in 1942 to only 4,500,000 board feet in 1943 is wholly accounted for by smaller rimu shipments from Greymouth to Australia. Not only has there been a shortage of trans-Tasman shipping, but even when boats have been available it has often been unsafe to work the bar at that port. While there has also been a decline in insignis-pine shipments to the Pacific islands and to Australia as a result of local shortages, the exports of silver-beech increased from the low figure of 142,000 board feet in 1942 to 719,000 board feet in 1943, this having been effected as an exchange for hardwoods released by the Commonwealth Timber Controller.

CHAPTER X.—UTILIZATION TECHNOLOGY

77. *General.*—Reduction of woods and mill waste by improved logging, transport, and conversion practices constitutes the outstanding long-term objective of national forest utilization technology, more particularly in the exotic forests. The short-term problem is that of adapting to many uses for which they are not inherently suitable a wide range of the indigenous and exotic timbers as substitutes for more suitable imported or local timbers not now available or in short supply as a result of war developments.

78. *Grading of Timber.*—It developed during the year that in Christchurch, although building-timbers were being sold under national grade names, they were not being supplied to the relevant definitions and specifications, but this position has since been voluntarily corrected and wood-users reassured that the national grading rules for building-timbers will be strictly observed. Further progress has been made in developing special provisions for individual timbers as supplementary to the proposed standard hardwood grading rules. The extending use of tawa, in some instances without due regard to the special care required in its handling and storage, emphasizes the need for their early completion. Standard specifications for New South Wales hardwoods in the more important use groups have now been completed.

79. *Specifications for Finished Products.*—The completion of a survey of sizes and profiles for dressed building lines has made it possible to finalize proposals for standardizing those features in three types of weatherboarding, flooring from 4 in. and 6 in. stock, secret nailed flooring from 3 in. stock, and matchlining in three thicknesses. Proposals for standard profiles and sizes of mouldings and joinery were examined in detail before submission to the Standards Institute. Considerable time was also spent in assisting with the development of specifications for standard household furniture for rehabilitation purposes. Two emergency specifications for special types of plywoods were prepared in co-operation with other interests, but are regarded as unsatisfactory, and must therefore be completely redrafted in the interests of future market development.

With the anticipated use of exotic framing for semi-prefabricated house construction and the increasing demand for Dressing B and better grades of indigenous timbers for all classes of finishing and furniture work, &c., it will be entirely feasible to secure a significant

proportion of the country's flooring requirements from the better class of Building A timber. It is not proposed, however, to introduce a new grade into the national grading rules, but to achieve the desired objective by formulating a standard specification for the finished flooring.

80. *Structural Utilization.*—Prefabrication has figured so prominently in public discussions on the housing problem that it is necessary to emphasize that, taking even the most optimistic view, any attempt to apply it to much more than half of the national house-building programme would seriously disorganize the country's general timber economy, by creating an unbalanced avenue of use for various grades and qualities of building-timbers. With so much deferred maintenance now existing as a result of the five years of war, this dislocation might not become apparent for a short period, but would inevitably develop later.

The tendency towards small-panel construction for prefabrication, adversely reported on in last year's report, now appears to be arrested, and latest developments indicate that the essentials to partial prefabrication, as consistently advocated by the Forest Service over the last five years, are now likely to form the basis of future developments. They are as follows:—

(*a*) The adoption of orthodox construction carried out in indigenous sub-flooring and flooring timbers, although some units may be constructed with exotic flooring:

(*b*) The use of large wall, roof, and ceiling panels carried out in exotic framing which has been kiln dried, pre-cut, and preserved to make it virtually as good as heart kauri or heart totara:

(*c*) The use of heart or preserved rimu and matai for both flooring and weatherboarding, and of insignis-pine sheathing and sarking:

(*d*) The possible use of one-piece wall linings of structural insulating-board as an interior lining, with door and window openings cut to give an unbroken surface free of all joints, thus dispensing with the necessity for ugly battens, and giving an attractive flat surface suitable either for paints or wallpaper finish. By using one-piece wall linings in place of narrow panels, the localized shrinkage and swelling of structural insulation board at joints is eliminated and splitting of wallpaper avoided.

81. *Mill Studies.*—Sawing-costs for various diameter classes of exotic logs were studied at the Waipa Mill. In Southland a special investigation into the milling of silver-beech was undertaken to ascertain the possibility of judging the interior defects in logs from such visible indicators as fungal fruiting bodies, branch stubs, &c. The result has been disappointing, but more study is required before any final conclusion can be reached.

82. *Utilization of Minor Timbers.*—Under the ever-increasing pressure of war conditions more and more demands have been received for locally grown timbers as substitutes both for imported woods and for other materials not now available. *Inter alia*, success has been achieved in the substitution of black-maire both for lignum vitæ for caulking mauls for shipwork and for boxwood for buffing-blocks for instrument spindles; of silver-beech for walnut and ash as packing-blocks for airplane spars and for sycamore for hosiery shapes; of insignis-pine for metal and rubber water-bottle stoppers; and, as later discussed, of matai for silver-pine for bushings for barrel bung-holes.

83. *Timber Mechanics.*—Major interest attaches to the continued testing of insignis pine grown under forest conditions. Standard tests have been completed on Whakarewarewa green material, and a commencement made with the testing of the air-dry timber, the preliminary results indicating that, except in the case of very rapidly grown and young wood, its air-dry strength in both bending and compression is relatively high, having regard to its density. A small number of air-dry specimens of Australian white stringy-bark grown in the Little River district of Canterbury gave strength values superior to those of northern rata, one of the strongest of New Zealand timbers.

Of other exotic forest timbers tested, European larch gave the following results, comparable strength values for the same timber grown and tested by the same methods in England being shown in parentheses:—

Static bending—		
Modulus of rupture (pounds per square inch)—		
Green	7,460	(7,200)
Air dry (12 per cent. moisture content)	13,510	(12,600)
Modulus of elasticity (pounds per square inch)		
Green	1,322,000	(1,200,000)
Air dry (12 per cent. moisture content)	1,744,000	(1,510,000)
Compression parallel to grain—		
Maximum crushing strength (pounds per square inch)—		
Green	3,230	(3,520)
Air dry (12 per cent. moisture content)	7,070	(6,990)
Shearing strength parallel to grain (pounds per square inch)		
Green	820	(890)
Air dry (12 per cent. moisture content)	2,000	(1,410)

In connection with the extended manufacture of casein-bonded moisture-resistant plywood, extensive series of standard dry and wet tests have been made to ensure conformity

to manufacturing specifications. Resin-bonded plywood also has been subjected to shear test: the wet shear figures are frequently as high as the dry values. In testing five-ply, glue lines are subjected to stress in series.

84. *Box-testing.*—Tumbler and drop tests of accumulator-boxes and various types of munitions containers have been carried out as a means of improving designs, drafting suitable specifications, and securing better performance under service conditions. Trials of banana-cases manufactured from mamalava—a Samoan wood—have indicated that, with slight modifications to their original design, entire satisfaction can be expected, thus allowing the use of local Samoan timber-supplies instead of calling upon New Zealand resources, already in short supply.

85. *Wood Technology.*—Following the visit of a Forest Service officer to the Pacific theatre of war, a major investigation of Pacific islands woods is in progress. The reference-slide collection and assembled data relating to New Zealand woods have proved useful in the search for substitutes for imported special-purpose woods. Routine identifications for both civil interests and defence services have covered a wide range of overseas woods in addition to indigenous and locally grown exotic woods, in all some forty species having been investigated.

Sample-plot investigations of exotic stands in Golden Downs State Forest have supplied the bulk of the material examined for specific gravity. The Golden Downs insignis pine aged from twelve to sixteen years had an average specific gravity (based on oven-dry weight and green volume) at the butt of 0·389, decreasing to 0·341 at the lowest green-branch level: these values are generally higher than those for similar-aged Kaingaroa timber. Slow-grown insignis pine approximately fifty years old from Central Otago had a maximum specific-gravity value at the butt as high as 0·502. Average figures for three trees were: butt, 0·432; mid-height, 0·403; and merchantable top, 0·399. Numerous small lots of other exotic-forest softwoods have been examined and tests made of both exotic and indigenous woods in conjunction with the routine identifications and standard mechanical tests already referred to.

86. *The Drying of Timber.*—More expansion in dry-kiln facilities occurred during the period than in any previous year in the history of the timber-trade, and most kilns were of modern design and permanent construction, allowing of automatic control of temperature and humidity and of positive control and reversal of air circulation. The only regrettable tendency is continued adherence to 8 ft. wide piles and narrow side flues sometimes only 18 in. wide—instead of a maximum width of pile of 7 ft. and a minimum side flue of 2 ft. in width. Intending kiln-owners unfortunately do not appreciate that, though their kilns hold one-seventh more timber, it takes at least that much longer to dry the larger load to the same average moisture content, whilst, in addition, some of the finished timber is wetter and other of it drier and poorly conditioned as compared with timber dried in the narrower piles. In other words, the 8 ft. piles are so wide that centre boards cannot be dried sufficiently without over-drying the outer boards, and, while the highest class of kiln drying calls for only 6 ft. piles, sufficiently good drying for most purposes can be achieved with 7 ft. stacks. Likewise, the wider side flues give a much more uniform distribution of air from top to bottom of piles and therefore not only hasten but ensure more uniform drying throughout the pile. Assistance was rendered new owners in starting up and operating their installations.

Timber-production is barely keeping pace with even urgent requirements for seasoned timber for housing, furniture, and other uses, and it is only the expanded kiln-drying facilities which enable these demands to be satisfied. The danger of acceding to these by supplying and using timber which has been insufficiently dried and/or unloaded and block stacked before cooling is generally appreciated by kiln-owners, but not by many users; but it is even more important to avoid the drying of mixed loads of different thicknesses, qualities, and species and to insist upon the proper control of the kiln-drying process by alteration of schedule conditions based upon the moisture content of an adequate range of samples and finally upon their stress determinations. Every user of kiln-dried timber, particularly manufacturers of high-quality products, should assure himself that the kilns from which he secures his supplies are operated in accordance with such precautions. A standard specification incorporating these principles has been formulated and will shortly be submitted for consideration by the Standards Institute. The real necessity for this specification arises out of the fact that badly kiln-dried timber can give infinitely worse results than poorly air-dried timber.

With numerous standard specifications for wood products now providing for definite limitation of moisture-content, it is hoped that more general recourse to moisture-content tests before use will follow in the woodworking industries. The public should realize that shrinkage of wood, whether in building or in furniture, &c., is *prima facie* evidence that the timber has not been adequately dried and stored and that universal insistence upon correction of the trouble by replacement of the offending timber or product is the most practicable means of securing any improvement in the technique of timber-drying and wood use.

87. *Wood-preservation.*—In view of continuing attempts by owners or agents for proprietary wood-preservatives to secure endorsement or use by Government Departments, &c., of their products and services, and of the danger of exclusive use thereof, it is necessary to restate the Forest Service view that no support should be given to the

employment of proprietary preservatives which, almost invariably, are either sold at excessive prices or withheld from sale in order to force the user to employ the proprietors in treating his timber. With few exceptions there are as good as and even better standard wood-preservatives which can be manufactured to recognized specifications at a much lower price. For instance, the standard pentachlorphenol preservative advocated by the Forest Service for the treatment of building-timbers has been found during the year to be at least ten times as toxic and valuable as one of the widely used proprietary lines being employed throughout the Dominion, and it is for this reason that some of the treating companies specifically use the pentachlorphenol preservative.

Equally important as the preservative is its effective application, and for this reason both treating companies and members of the public who consult the Forest Service are advised that employment of a supervising architect or builder is desirable in order to attain this end and protect their mutual interests. The Forest Service has further advocated the removal of emphasis in advertising such work from borer control to the more inclusive and important basis of *house-maintenance*. Unfortunately, the philosophy of wood use for New Zealand building has been one of specifying the very highest grades and quality and imagining thereby that the whole wooden structure may be forgotten and neglected virtually for a generation or more. Epitomized, it is a philosophy of abuse rather than use, and it is no exaggeration to say that if builders, painters, and treating companies would co-operate to give a regular annual house-maintenance service the effective life of dwellings could be doubled by correcting from year to year any defect which might develop in the wood due to fungal and insect attack, paint failures, &c.

An appropriate specification covering the quality of wood-preservatives and their application to building-timbers has been submitted to the Standards Institute for submission to a special committee already set up to consider such matters.

Of the various chemicals tested at the Waipa Mill for the prevention of sap-stain on insignis pine, Lignasan, Dowicide, and Santobrite have proved effective, and while the first is less troublesome than the other two, the difficulty of avoiding dermatitis through long-continued handling of the dipped timber has forced the Department to resort, so far as is practicable, to kiln drying as an alternative, although the possibility of dipping the timber after stacking in unit packages is now under investigation and will probably be adopted.

88. *The Painting of Wood.*—Erection of panels on the vertical paint-test fence at Wallaceville was completed during the year in order to ascertain the most suitable priming paints for insignis pine, some eight types being under test on weatherboarding panels featuring edge and flat-grain timber, and two grades based upon size and frequency of major defects. Control panels of heart rimu are also being used in a parallel test series embodying rimu boards of varying grades and quality. Observations of other paint tests under the control of the inter-departmental Paint Committee have been continued.

The degree of water repellence afforded by locally available products such as creosote, oleates, waxes, and their combination with metallic salts was studied, using insignis-pine test specimens. As a result it was established that in both water immersion and high humidity exposures one hot-dip solution of copper oleate and wax in a fuel oil imparted a useful degree of repellence and reduced the serious surface checking characteristic of both untreated and painted rimu plywood after exposure to weather. A related problem—retardance of dimensional change—arose in connection with wooden bushings for bung-holes of barrels. Silver-pine had been tried in service with fair satisfaction, but as a result of tests of both treated and untreated insignis pine and matai the untreated matai was shown to be much superior, altering its shape in use much less than the other woods.

89. *Plywood-manufacture.*—A Forest Service junior technical officer was stationed at one of the new plywood-factories to assist in the solution of current problems in the manufacture of both casein- and resin-bonded plywood for defence works. While marked advances have already been effected in manufacturing technique, there is still considerable room for improvement. The tentative conclusion has been arrived at that the high moisture content of rimu and other indigenous logs makes it extremely difficult to dry their veneers in standard driers and at the rates, temperatures, and humidities usually employed in plywood-manufacture. The matter is being further studied. A grading study of peeler logs has also been commenced, as it has been established beyond all possible doubt that for the local product to compete post-war with imported plywoods on a quality basis it will be necessary to improve the quality of logs at present being supplied. Straightness of grain and reasonable freedom from defects are essential to the production of sheets free from twist and warp, &c., and only by the development of a rigid log-grading rule can plywood-factories be assured of suitable log-supplies.

90. *Pulp and Paper Production, &c.*—Investigations into the possibility of establishing a local pulp and paper industry based on the utilization of exotic softwoods have been advanced by a searching study into recent developments in the pulp and paper industry in Australia. The results show that the only manner in which a healthy and economic enterprise can be established in New Zealand is through the adoption of a large central scheme by the operation of which the public can be assured of receiving locally manufactured paper in place of the imported article without any increase in existing tariffs. For this country to allow the future of such an industry to be jeopardized by piecemeal development and the erection of small uneconomic units would be a tragedy without

parallel in the annals of New Zealand's economic history, and a comprehensive report setting out the facts of the position is now in course of preparation and rapidly approaching completion. Basic studies into the utilization of exotic softwoods for the production of various classes of pulpwood paper products continue to be made.

The suggestion has been advanced that to improve the dimensional stability of locally manufactured structural insulating-board it should be used as the core for a composite board, each side being faced, first with a bitumen-impregnated paper as a vapour barrier and then with an outer asbestos-cement layer. Such a board would have a high degree of dimensional stability and be suitable for use either as an interior lining or as an exterior sheathing or panelling.

91. *Charcoal-production.*—With adequate supplies of the cheaper Waikato "char" made available to users of gas-producers, charcoal-burning by the Forest Service has now ceased at all centres. The plant at Rotorua produced 54 tons before being closed down in September last. Total sales were 57 tons, while residual stocks were 62 tons.

CHAPTER XI. MISCELLANEOUS

92. *Legislation.*—No amendments to the Forests Act, 1921–22, were enacted during the year. Section 5 of the Reserves and other Lands Disposal Act, 1943, cancels the reservation as an endowment for primary education over an area in North Auckland district containing 567 acres, being Section 4, Block XV, Russell Survey District, and sets the land apart as a permanent State forest.

A notice issued in pursuance of the Forest (Fire-prevention) Regulation 1940, as amended in 1943 by Amendment No. 1, prohibits, except with a permit given by the Conservator or other forest officer, the use of portions of the Rotorua–Waikaremoana and the Dargaville–Opononi Roads by vehicles principally operated by means of a gas-producer unit during the period from the 1st day of August in any year to the 30th day of April in the following year (inclusive), the purpose being to afford special protection to the vast Kaingaroa State Forest and the famous Waipoua Kauri Forest.

93. *Finance.*—Under Appendix VI is published a summary showing the receipts and payments from the State Forest Account for the year ended 31st March, 1944, together with comparative figures for the previous three years; for the complete departmental accounts reference should be made to parliamentary paper B. 1 [Pt. IV].

The gross expenditure under vote has increased from £516,119 for 1942–43 to £557,258 for the year under review, and this is largely attributable to the need for replacing motor transport that had been kept on the roads since before the war, and to the purchase of additional heavy trucks, tractors, and of roadmaking equipment to carry out the extended commitments for the production of logs and sawn timber. General management charges, salaries, and expenses have shown a gross increase of approximately £16,000, which, however, includes salaries and expenses involved in the departmental expansion of log-timber production for war purposes, but which are offset by increased revenue.

Revenue again increased this year by £45,000 compared with the previous year. It will be noted that revenue from sales of standing timber has decreased approximately £20,000, but this is offset by increased log sales from managed forests, wherein the increase is nearly £43,000. Total sales from utilization projects have increased by £23,000.

During the 1942–43 year the expenditure on timber-control activities amounted to £11,349, exclusive of any share of the general overhead of the Department, and the corresponding cost for 1943–44 will be substantially higher, probably in the vicinity of £14,000. As the gap between expenditure and revenue in the State Forests Account is financed by loan moneys, it would appear that the expenditure on timber-control work, which has the effect of increasing the amount of loan moneys required, should properly be transferred to War Expenses Account.

94. *Subventions to Local Bodies, &c.*—Attention has been drawn in previous years to the subventions of State forest revenue to local bodies and to Consolidated Fund. The extent of this tax on forest finance will be seen from the figures for the past three years quoted below:—

Year.	Consolidated Fund (under Section 39 of Forests Act, 1921–22).	Local Authorities (under Section 17 of Finance Act, 1924).	Local Authorities (under Sections 6-7 of Forests Amendment Act, 1926–27).	Total.
	£	£	£	£
1941–42 ..	20,443	17,080	8,261	45,784
1942–43 ..	16,721	14,767	7,065	38,553
1943–44 ..	17,455	12,928	7,596	37,979
Totals ..	54,619	44,775	22,922	122,316

As in the case of timber-control expenditure, these payments result in an increase in the amount of loan moneys required to meet the excess of expenditure over receipts in the State Forests Account.

The actual amounts of loan moneys received during each of the past three years and the amounts by which the excess of expenditure over revenue would have been reduced if it had not been necessary to meet these payments are as follows:—

	1941–42.	1942–43.	1943–44.
	£	£	£
Loan moneys obtained	200,000	110,000	110,000
Timber-control expenditure	3,868	11,349	14,000*
Subventions to local bodies	45,784	38,553	37,979
Possible reductions in loan moneys ..	49,652	49,902	51,979
* Timber-control expenditure and subventions to local bodies as a percentage of loan moneys obtained	24·83	45·14	47·25

95. *Recreation in State Forests.*—With the continuation of the war, the curtailment of road and rail travel, and the absence on active service of most of the young and active men, it was inevitable that comparatively little use would be made of the State forests for recreation, but deer- and pig-hunting parties were numerous, due probably to the high price of deer-skins and the rationing of meat. Shooting parties were severely discouraged from operating in the exotic forests owing to the risk of fire.

Again the indigenous forests were extensively used for the advanced training of troops in bush craft and jungle warfare.

96. *Mining Privileges.*—Twenty-six applications were received; last year's total was 72. Consent was given to 1 application to prospect for oil in a State forest.

97. *Grazing Licenses.*—Licenses and leases number 203; 6 were surrendered and 8 granted during the year.

98. *Rehabilitation.*—Further progress has been made in the acquirement of land for new afforestation projects and in extending the area available in existing projects. In several timberless districts it has so far not been possible to locate areas which will satisfy all requirements as to soil quality, reasonably easy topography, accessibility to market, and of an average which will ensure that management and administration expenses per acre will be sufficiently low to guarantee economic yields of forest-produce. Search for blocks which will satisfy these broad requirements is continuing. The total area acquired at the end of the year is 46,600 acres, whilst areas approved and selected but not yet actually purchased amount to 126,200 acres. In addition, the total area available for this purpose in State forests proclaimed prior to the war period is 77,300 acres.

The land purchased provides for the establishment of new afforestation projects in North Auckland, Hawke's Bay, Wairarapa, Nelson, Westland, North Otago, and South Otago districts, and also substantial areas for the extension of established State exotic forests in Rotorua, Nelson, Canterbury, and Southland districts.

Apart from roading, installation of communications, and other developmental improvements as well as tree-planting on new areas, the rehabilitation programme provides for thinning, pruning, and other improvement work in large areas of existing State forests, both exotic and indigenous. In preparation for the rehabilitation programme a five-year plan of works to be undertaken and their estimated cost, and also of the numbers of returning servicemen who can be employed, is being prepared for each project, and such planning has been completed respecting one-half of the total number of forest projects which are to receive attention.

99. *Export Butter-box and Cheese-crate Pools.*—In connection with the export butter-box pool, which operates only in the North Island, deliveries of timber to North Island boxmakers for the manufacture of butter-boxes for the year ending 31st March totalled 15,296,000 board feet (19,286,000), including 6,713,000 board feet of rimu (7,102,000).

Butter-boxes manufactured for the pool during the year reached a total of 3,379,000 boxes (4,205,000). The reduced manufacture compared with last season was due largely to the short supply of butter-box timber to boxmakers owing to exceptionally bad conditions on the Greymouth bar. To offset the reduced production, fibre-board boxes were used, and a total of 1,850,000 of various types have been delivered to dairy companies or are held in store by the New Zealand Dairy Board.

Owing to unexpected delays in the arrival of the corrugated fibre-board boxes from North America, the period September to December proved a very critical one, and in order to provide the dairy industry with sufficient boxes it was necessary to resort to the local manufacture of some 350,000 fibre-board boxes of the "Saranac" wire-bound type with cleated wooden ends. The fibre-board used for these was of the solid type, and not being of pure chemical pulp was of poor quality and gave disappointing results. A further 230,000 "Saranac" type boxes made from solid board manufactured at Whakatane from imported kraft pulp, however, gave excellent results.

It was also possible to secure ex Canadian mills sufficient pure kraft for the manufacture of 300,000 "Saranac" type boxes, but results have not been as good as in the case of the Whakatane board. A trial shipment of 25,000 dump-type corrugated fibre-board boxes—that is, boxes without wooden ends—made in Auckland from imported pure kraft liner reached Great Britain in satisfactory condition. While inferior to the imported American packages of the same type, London has made representations that more of these boxes be used if local manufacture is possible. The outlook for the ensuing season may be viewed with reasonable confidence.

For the export cheese-crate pool, which covers both Islands, 1,182,264 cheese-crates (1,401,565) were manufactured. The supply position in the South Island was quite satisfactory, but deliveries of timber to North Island cratemakers equalled only 9,203,000 board feet (15,295,000), with the result that stocks were seriously depleted. It was necessary to secure some cheese-crates for North Island dairy companies from South Island crate-manufacturers.

A further acute demand for case timber will prevail in the North Island during the coming pool year, and in consequence it has been deemed necessary to make forward arrangements with South Island crate-manufacturers for the supply of approximately 100,000 crates to northern dairy companies during the year.

CHAPTER XII.—TIMBER CONTROL

100. *Timber Production Advisory Committee.*—The Timber Production Advisory Committee was created by the Minister of Supply and Munitions by notice issued under the Supply Control Emergency Regulations 1939 in November, 1943.

The personnel of the Committee is: Commissioner of State Forests (Chairman), Messrs. W. C. Ward (Vice-Chairman), (State Forest Service), H. Parsonage (National Service Department), N. Burnett (Ministry of Works), G. H. Chapman (Dominion Federated Sawmillers' Association (Incorporated)), W. Seator and F. Craig (New Zealand Timber-workers' Industrial Union of Workers), and D. G. O'Toole (New Zealand Timber-merchants' Association).

The Committee was set up to advise the Minister of Supply and Munitions on any measures likely to result in the more efficient working of the industry in relation to the wartime production of timber.

The first meeting was held on the 11th November, 1943, and altogether the Committee met on three occasions before the 31st March.

With shortage of man-power as one of the major problems facing the industry, the Committee gave much of its attention to finding a solution to the difficulties being experienced by millers. As a result of the Committee's work the release of volunteers from the Army in the Pacific area was arranged, and although the releases did not become effective before the end of the year under review it is anticipated that production of timber during the current year will benefit materially.

101. *Declaration of Timber Industry as Essential.*—Declarations of essentiality affecting the timber industry issued during the year in pursuance of the Industrial Man-power Emergency Regulations 1944 (Serial number 1944/8) (formerly the Industrial Man-power Emergency Regulations 1942) are as follows:—

(*a*) Declaration of Essential Industry No. 7 (the industry of sawmilling): Amendment dated 14th May, 1943 (*Gazette*, 1943, page 606), includes the production of power and telegraph poles, railway sleepers, fencing-materials, and firewood:

(*b*) Declaration of Essential Undertaking No. 99 (*Gazette*, 1943, page 433) applies to the maintenance and protection of exotic forests owned by twenty-one local bodies and afforestation companies:

An amendment dated 5th May, 1943, and published in *Gazette*, 1943, page 607, corrects the name of an afforestation company included in the declaration:

An amendment dated 22nd June, 1943, and published in *Gazette*, 1943, page 730, deletes an afforestation company wrongly included in the declaration:

(*c*) Declaration of Essential Undertakings No. 71 (*Gazette*, 1942, page 1394) applies to certain specified undertakings in respect only of their timber-yards, joinery-factories, and planing-mills:

Undertakings included during the year: Dated 30th September, 1943, and published in *Gazette*, 1943, page 1197.

102. *Industrial Man-power.*—During the early part of the year the shortage of man-power became more acute, but later this deterioration was balanced by the release of men from the Armed Forces which exceeded losses caused by withdrawal for military service and normal wastage due to old age, sickness, &c. The difficulty of obtaining skilled bushmen is still the controlling factor in production, the numbers being insufficient to supply logs to all mills for forty-eight hours' operation. Unfortunately, very few key logging operatives have been found among the Armed Services' personnel in this country, but continual

pressure has been exerted to effect the release of bushmen wherever they have been located. The present withdrawal of volunteers for the industry from the South Pacific area will improve the position materially during the current year.

The seriousness of the man-power position and the need for close co-operation between Man-power Officers and the industry led to the establishment of Local Man-power Advisory Committees in the main sawmilling regions. These Committees consist of representatives of the sawmillers and the Timber-workers' Union and the District Man-power Officer, who meet under the Chairmanship of the Regional Timber Controller, and it is their duty to see that all available man-power is allocated and used to the best advantage within the district.

The continued demand for timber for defence works, for essential building within the country, for shipment to the South Pacific, and for the manufacture of food, munition, clothing, and other containers for export to various theatres of war has necessitated the maintenance of the maximum possible production even at the expense of future development work. To assist in achieving this objective the under-mentioned notices were issued in pursuance of the Industrial Man-power Emergency Regulations 1942:—

(*a*) Sawmilling Industry (Easter Holidays) Notice 1943 (*Gazette*, 1943, page 440) required every sawmilling undertaking to continue working until the normal closing-hour on Wednesday, 21st April, 1943, and to resume not later than the usual time on Wednesday, 28th April, 1943, thus varying the existing requirements regarding the weekly operation on a forty-eight-hour week:

(*b*) Sawmilling Industry (Christmas Holidays) Notice 1943 (*Gazette*, 1943, page 1408) required in the same way that mills continue working till the evening of Wednesday, 22nd December, 1943, and resume again not later than Wednesday, 5th January, 1944:

(*c*) A notice in terms of Regulation 20 of the Industrial Man-power Emergency Regulations 1942 (now replaced by the Industrial Man-power Regulations 1944) was issued to the individual sawmillers on the 26th November, 1943, requiring both the sawmillers and their employees to work forty-eight hours each week. This notice replaced and was in substitution of a previous notice issued by telegram.

Provision was made in these notices for relaxation or variation of the requirements by consent of the Timber Controller.

The Department also covered on behalf of the Timber Controller the checking of all claims from the sawmilling industry for subsidies on the working of a forty-eight-hour week. Payments under this heading for the year amounted to £69,515, compared with £52,227 for the previous year. The extra production secured by the operation of the subsidy is placed at 25,000,000 board feet.

Miscellaneous services to the timber industry were maintained, the Department holding small emergency stocks of blankets and of special boots for urgent sale to the personnel engaged in the industry, mostly to men directed under man-power authority.

103. *Petrol and Tire Conservation and Vehicle and Tractor Supplies.*—The arrangement as outlined in the 1942 report to conserve petrol and tires was continued throughout the timber industry with good results. Every assistance has been given to the industry by way of arranging loans, exchanges, supplies of spare parts and machines, and the procurement of essential tractors and other equipment. The close co-operation of the Public Works Department and the Transport Department in this particular matter is acknowledged with appreciation.

A complete breakdown in both log and timber transportation was narrowly avoided by the release of motor-vehicles surplus to Army requirements, these being released by the Ministry of Supply direct to the agent acting for the user. Both the Army Department and the Ministry of Supply were cognisant of the position, and the valuable assistance rendered is also acknowledged with appreciation.

104. *Essential Supplies.*—Owing to the early arrival of national reserve stocks of wire rope, saws, hoop, steel, corrugated fasteners, and steel rails, there was no loss of production in the industry through lack of supplies. The later delivery of bulk orders has improved the position still further, and now that there are adequate quantities to last for a considerable period all national reserve stock except saws have been absorbed into the bulk supplies. Slower deliveries of saws, however, have made it necessary to keep present stocks under more strict control in the meantime, and releases are approved by the Office of the Timber Controller only when it is established that production will cease unless saws are obtained. Absorption of the other steel materials into the bulk supplies, however, does not remove the control of releases, and all bulk supplies are carefully rationed by the Steel Controller through the various Controllers of each industry. Consequently, to obtain a release of wire rope or other steel material the sawmiller must make application to the Timber Controller on the prescribed form M.S. 125 for the necessary approval to purchase the required material from a merchant. On presentation of this form duly approved to the merchant, supplies are made available, and the merchant keeps the form as his authority for the sale.

Action was taken from time to time to secure the release of other materials and supplies as they were required by the industry, and all possible assistance was given in order to maintain production.

105. *Timber Purchases for Defence Works.*—The purchase of timber urgently required for defence works was continued during the current year until approximately October, 1943, from which date the Department ceased the purchasing of supplies for new works, servicing these merely by placing orders on behalf of contractors. Only for old work still in progress has it continued to order and pay for supplies and for timber required for special war purposes.

Payments for timber purchased for the year ended 31st March last amounted to £800,860, compared with £1,157,737 for the previous year. During this year, also, the staff commenced the rechecking of all timber quantity and quality records for each defence work, as well as all relevant rail, ship, and cartage accounts, and the preparation of statements showing quantities supplied, supported by invoices, &c., were well advanced by the end of the year under review. A number of recoveries for overpayments for timber, freight, &c., have already been effected as a result of this check.

An inspection of timber intended for shipment to our American Allies in the Pacific islands for the purpose of building a mobile hospital revealed that inferior grades quite unsuitable for the purpose had been included. Upon subsequent investigations it became apparent that a serious departure from the timber specification and the substitution of practically worthless timber had taken place, and legal proceedings were therefore instituted. The cases were heard in the Magistrate's Court, and the most serious one referred to the Supreme Court for trial. The jury, however, failed to agree at two trials, and the proceedings were stayed accordingly in all cases.

106. *Timber Control Notices.*—The following notices were issued pursuant to the Supply Control Emergency Regulations 1939 and the Timber Emergency Regulations 1939:—

(*a*) Notice No. 55 (*Gazette*, 1943, page 449) requires that no proprietor of any sash-and-door factory or joinery-factory shall manufacture or permit the manufacture of any door unless it is one of the types specified in the New Zealand Standards Specification for Doors, numbered N.Z.S.S. E.106. The Notice is administered by the Building Controller, whose prior written consent is necessary to the manufacture of doors other than those specified. One of the most significant features of the standards specification is its insistence upon the use of kiln-dried timber:

(*b*) A notice published in *Gazette*, 1943, page 1106, revoked Timber Control Notice No. 26, which prohibited the sale of Westland timber in the Southland and Otago Land Districts, the mills in these latter districts now being unable to satisfy the local demand.

107. *Removal and Erection of Sawmills Notice 1941.*—A total of twenty-nine consents to the removal and erection of sawmills was given under the provisions of this notice, which is a subsidiary one under the Timber Emergency Regulations 1939 and provides that no person may erect or remove a sawmill except with the precedent consent of the Timber Controller. The consents issued include eleven for the erection of new mills and eighteen for the removal of existing mills to other sites.

The administration of this notice calls for a careful review of each case to ensure the utmost economy in the road transport of both log-supplies and sawn timber, and also the maintenance of stability in production by existing sawmilling units, with particular regard to conservation of man-power, sawmilling equipment, and log-supplies. To implement these considerations applicants are required to furnish assurances that they can secure the man-power necessary to staff their operations without taking workers from established units and that they can secure all necessary equipment within the Dominion. Although the securing of the highest possible production of sawn timber is of major importance, it is necessary, in view of the limited log-supplies available in some districts, to ensure as far as possible that the production of any established sawmill will not be materially reduced or its cutting life excessively shortened by the operation of an additional sawmill in the district; otherwise the total national production would not benefit.

One sawmill which had closed down was acquired for the Armed Forces in the Pacific, and the owner was compensated in terms of the Supply Control Emergency Regulations 1939.

108. *Sale and Purchase of Forests.*—In terms of Regulation 3 of the Timber Emergency Regulations, 357 applications for consent to the sale and purchase of forest were dealt with during the year and consents issued, but in some cases it was necessary to require timber to be made available to sawmillers other than the applicants. The transactions involved fall into three groups:—

(*a*) *Privately Owned Forest.*—The greater proportion of these were in respect of insignis-pine trees comprising small farm lots and shelter-belts, and the co-operation of farmers throughout the Dominion in permitting the cutting of such trees to provide much-needed timber-supplies for the manufacture of munition and foodstuff containers is greatly appreciated. Quite a few appeals were made by sawmillers for the Timber Controller to exercise his powers under the Timber Emergency Regulations 1939, Amendment No. 1 (1943/106), whereby he may require an owner to dispose of his trees, but in no case was it necessary to resort to this authority. In all such cases the departmental policy is to appeal to the owners to release any trees which do not constitute essential shelter. In some

instances owners have been reluctant, on sentimental grounds, to agree to the milling of trees planted by their forbears, but after an explanation of the purpose for which the timber was required they have willingly come to an amicable agreement with a local miller for their disposal. The services of the Timber Controller are also offered to the owner by way of measuring and valuing his trees and of protecting him against reasonably avoidable damage, &c., by the logger or miller to land and fences, &c.

(*b*) *Native-owned Forest.*—As in the case of privately owned forest, the parties to any transaction for the sale and purchase of Native-owned forest are required, wherever practicable, to negotiate in the ordinary way, but such negotiations in nearly all cases have as their basis a valuation of the timber made by the State Forest Service, as the Native Land Court may not grant any right to cut timber or confirm any instrument of such grant without the consent in writing of the Commissioner of State Forests under the Forests Act, 1921–22, and a Forest Service appraisal is a prerequisite to such consent. Where it is a matter of urgency that log-supplies be made available to keep a sawmill in production, the Timber Emergency Regulations 1939 provide a short cut to the normal procedure, and when there is agreement between the parties the practice is to make a sale by direction notice of sufficient forest to enable a sawmiller to secure only a year's supply of logs at one time. The reasons for this limitation are threefold:—

(1) It affords sufficient time to complete negotiations, if both parties so desire, to conclude arrangements for further supplies:

(2) As the war must inevitably terminate sooner or later, the exercise of wartime timber control will also cease, and none of its powers should therefore be projected forward on anything else but a short-term basis:

(3) It also assists the State Forest Service in coping with a huge volume of appraisal work with a very limited staff.

The soundness of this policy was demonstrated during the year when, under the guise of timber-production, certain millers negotiated with various Native interests, and both Natives and millers jointly requested the Timber Controller to use his powers to make direction sales of many thousands of acres of Native forest. This was regarded as a flagrant attempt to have the powers of the Timber Controller misused for the purpose of circumventing the Native Land Court. Ultimately it developed that the Native negotiators had not been formally authorized by the tribal owners to arrange for a direction sale of even a year's supply, which meantime was in process of being effected, in one case to one of the applicant millers who was short of immediate supplies and in another to an entirely different miller who was similarly placed. After suitable representations, however, to the assembled owners in meeting before their Native Land Court, it was agreed that the two direction sales each for one year's supply should be proceeded with, on the understanding that in all future sales the Office of the Timber Controller agreed to prior consultation with accredited representatives of their tribal council, and this procedure has since been standardized.

Owing to complications which arise from multiple ownership, the Timber Emergency Regulations relating to Native-owned forest prescribe a different legal procedure to that covering privately owned forest. The regulations provide for a Maori Land Board to accept service of a notice requiring timber to be sold to sawmillers nominated by the Timber Controller, and on receipt of a notice the Board is required to take such steps as it thinks fit to advise the owners, who can lodge an objection within twenty-one days. If no objection is received or allowed by the Timber Controller, he is required to execute in his own name on behalf of the owners an instrument of sale and to fix the price payable under the instrument, such price being subject to confirmation by the Native Land Court. Pending the completion of an instrument of sale the Timber Controller may authorize a sawmiller to commence the cutting and removal of timber, but no such authorization is issued until the sawmiller makes a substantial cash deposit. The co-operation received from Native owners and Maori Land Boards in all these transactions has been excellent. During the year four direction notices were issued affecting Native-owned timber, but in one case the immediate urgency passed and the notice was withdrawn, thus allowing the sale to proceed in the ordinary way.

(*c*) *Exotic Forests.*—Two applications were received for consent to the sale and purchase of exotic-pine forest established for commercial purposes by afforestation companies, while further similar applications are pending. The forests affected are immature—less than twenty years old but are sufficiently well grown to produce timber, the great demand for which, together with the depletion of shelter-belt supplies, &c., has attracted sawmillers, while, no doubt, the owners see an opportunity of obtaining a monetary return much earlier than recently anticipated.

As it became obvious that there was a danger of such forests being unduly sacrificed to meet the present war emergency, it was deemed advisable in the public interest that consent to the milling of exotic forests in which the public are financially interested should be subject to proper forest-management and fire-protection precautions. Consents given have therefore required the vendor companies to submit for the approval of the Timber Controller a forest working plan setting out reasonable proposals for silvicultural management and re-establishment of the area which will be cut over, together with fire-prevention

and control measures which will be instituted. Similarly, consents given to the applicant sawmillers are subject to conditions requiring the installation of a sawmill containing reasonably suitable equipment under war conditions for the economical conversion of the timber and the submission of details of fire-prevention and control measures to be undertaken. In both matters the approval of the Timber Controller is required.

The advice and co-operation of officers of the Service in dealing with these matters are freely given when desired.

109. *The Timber Position.*—Never before in history have New-Zealanders been made so acutely aware of the adage that timber follows man from cradle to grave. Few, however, realize that consumption is not very much out of step with production. What actually creates the shortage—and an acute one at that—is the virtual non-existence of timber stocks either at mills or in merchants' or manufacturers' yards. This is the direct result of the unfortunate failure of those in charge of defence works to better equate consumption with production and thus allow the maintenance of adequate stock balances. Repeated efforts by officers engaged on both building and timber-control activities to ensure that contracts were let in accordance with such a policy proved abortive, but with the ever-present threat of Japanese aggression this can be understood. Had New Zealand only 75 per cent. of the stock which existed prior to the war, and amounting in the two Islands to over 100,000,000 board feet, there would be little, if any, timber shortage. Such stocks normally function as a fly-wheel to the timber trade and absorb all current fluctuations due to shipping dislocations, immobilization of winter production owing to bad roads, unbalanced production of grades and qualities, &c. It is therefore an inescapable conclusion, that, no matter how much timber-production is likely to increase, for obviously this must be limited by man-power and equipment considerations, a shortage will still continue until substantial stocks have again been assembled. For this reason careful control of the distribution of timber is imperative, and an appeal is made to all wood-users to strictly limit their requisitions for the immediate future to absolutely essential requirements so that the stock position may be gradually improved and their later wants well serviced.

To ensure that timber available is used to best advantage, End-use Committees representative of both distributors and users were set up during the year in Auckland, Wellington, and Palmerston North to supervise sales and usage of timber, and further Committees are shortly to be established in other parts of the North Island. In order to economize grades in shortest supply, the Office of the Timber Controller also supplied builders, sawmillers, and timber-merchants in the North Island with particulars of the highest grades which should be used for different parts of house and building construction, requesting that delivery of superior grades be refused. This step has brought forth an excellent response from members of the organizations concerned, and as a result the unnecessary use of grades in heavy demand has been corrected to some extent.

The End-use Committees are a reflection of the basic policy adopted by the Office of the Timber Controller from the inception of hostilities, whereby control of production and distribution has been effected by voluntary arrangements between the various interests affected and every effort made to avoid resort to gazetted regulations. New Zealand, in fact, is believed to be the only country within the British Commonwealth and the United Nations which has not resorted to detailed permit control of timber distribution and usage, but it would be unwise to ignore the possibility of its institution should the End-use Committees fail to stop the leakage of timber to non-essential construction and maintenance. As indicative of the rigid control imposed on timber usage in Great Britain, it should be noted that fines of £500 have been inflicted for the misuse of £5 worth of timber. The effect of small and seemingly insignificant orders or demands for timber is insufficiently appreciated. Consider, for instance, that if each of the 80,000 farm holdings and the 380,000 houses in the Dominion is to be supplied with only 100 board feet of timber during the next year, there will be absorbed in total 46,000,000 board feet of timber, or sufficient to build over 4,000 all-wood houses. This will emphasize the fact that, unless all users refrain from ordering timber other than for absolutely essential purposes, the time may come when no timber whatsoever can be purchased except by permit and after a searching investigation into the necessity for its use.

As a further step towards the objective of transferring as much as practicable of timber-control activities to the trade and users, the North Island sawmillers have been encouraged to set up an organization to control in accordance with general policy direction from the Office of the Timber Controller, the detailed distribution of their production to the various End-use Committees.

Incidentally, the timber shortage has been very much more severe in the North than in the South Island, which has had for many years a surplus production of about 40,000,000 board feet for either export to Australia or shipment to the North Island. With defence works largely concentrated in the North Island over the 1942–43 period, the annual contribution of 30,000,000 board feet from Westland, &c., proved invaluable and allowed the transfer also of many South Island building artisans to expedite urgent war projects. Unfortunately, however, with the Greymouth Harbour largely out of commission since last year, timber shipments have fallen to about 20 per cent. of normal, and the resultant shortage of over 10,000,000 board feet of building-timber over the last

seven months has been responsible in no small measure for the acuteness of the current shortage. Obviously, too, with these additional supplies available to the South Island markets it was illogical to maintain South Island building artisons in the North Island and intensify its timber shortage when they could be used to expand building activities in the South Island, where relatively good supplies were available. The recent decision to return them to the South Island will therefore assist to relieve the North Island timber position.

110. *Timber-prices.*—Similarly in the price field, every effort has been made, in conjunction with the Price Investigation Tribunal, to avoid the gazetting of involved price-control orders, the policy being followed of working to approved trade price-lists and carefully policing their application and correcting any dangerous tendencies or misuse.

The most serious tendency which it has been necessary to counter in respect to wholesale marketing has been the development of various practices whereby millers can obtain a greater price for their product than securable under normal trading conditions through their approved price-lists. On a seller's market with all buyers willing to take virtually any timber offering there is not the usual incentive for millers to place their business with the timber-merchants, and expansion of a direct mill-to-consumer business is therefore natural, particularly when the buyer will forego the North Island 7½ per cent. discount which the miller must pass on to the timber-merchant in accordance with the approved price-lists. The consequential tendency, however, is for merchants in turn to compete for their usual supplies by foregoing the 7½ per cent. to which they are entitled, and on a specific instance of this nature a warning was issued to both sawmillers and timber-merchants that such practices were regarded as endangering the country's economic stabilization policy and should cease forthwith. Likewise, there have been reports of mills selling direct to consumers at local merchants' rates and also of timber-merchants selling to consumers ex-truck at ex-yard rates, but it has been extremely difficult to secure evidence on these matters owing to the fear of complaining buyers that future supplies will be jeopardized by their disclosures. Both the sawmillers' and timber-merchants' organizations, however, are fully alive to the danger and undesirability of such practices and endeavour to dissuade their members from bringing the trade into disrepute and forcing the issue of involved price-control orders.

Still other undesirable practices, fortunately not widespread, have been the charging of "clears" rate 2s. 6d. per 100 board feet extra—for Dressing A timber, of excessive "extras" for the running of mouldings and even of flooring, and of retail prices for bulk orders. Instances of these were met with continually in the purchases made by the Office of the Timber Controller for defence works, and in all cases detected appropriate adjustments were negotiated and arrangements made with the national organizations affected to ensure that such practices ceased. In some cases it should be explained these practices could be defended on the basis of existing price-lists, but, while they might therefore be regarded as within the letter of the law, they most certainly were not within the spirit of the law, particularly in respect to the country's policy of economic stabilization.

On still another aspect of timber-prices the public may be completely reassured. In accordance with the policy adopted by the Government in 1936, all increases during the war, as during the pre-war period, have been limited to extra production costs arising out of award alterations, including payment for holidays, and of increased cost of wire rope, saws, supplies, &c. The total increases over the war period, exclusive of sales tax, represent a rise of only 8 per cent. in the average mill price of timber. The increase, of course, has been larger in respect to individual grades, but these have been offset by smaller increases in other grades. In so far as house-building is concerned, the total rises in the sales value of timber ex-mill represent only 6d. per square foot of building area, although, if all finishing and joinery timber is now kiln dried instead of being merely air dried, as was previously the practice, another 2d. per square foot should be added, making a total of 8d. out of the 7s. increase characteristic of North Island building operations—that is, less than 10 per cent. of the total increase in building-costs. As far as it has been possible to ascertain, the increases in timber-prices during the war period have been less than in any other English-speaking country.

111. *Timber-production.* Timber production as distinct from distribution has been the subject of serious misunderstanding during the year. The policy of both the Office of the Timber Controller and of the Forest Service has been regarded in some quarters as detrimental to the maintenance of production, whereas the actual results show that, in spite of a deteriorating man-power and equipment position, it has been possible to maintain production over the first four years of the war.

To appreciate the present position it is necessary to traverse developments over the entire war period. When hostilities first commenced the stock position was good and the industry on a relatively stable basis at an annual productive level of just over 300,000,000 board feet, which has been maintained from 1936 onwards. The immediate effect of the war was to cause considerable hesitancy over forward building and constructional commitments, with the result that demand receded and stocks rapidly became excessive, so much so that within a few months it became necessary to zone or restrict the Dunedin and

Otago markets to Southland and Otago mills in order to reduce their stocks and absorb current production. By this means Westland timber, which met a substantial portion of the Otago demand, was released for increasing exports to Australia. The arrangement was agreed to both by the Government and by the sawmillers.

Immediately following this zoning, a close study was made of the general position and of developments which had occurred in the timber trade during World War I. This latter study showed an annual fall in production and demand of about 6 per cent. to 7 per cent., due basically to the declining man-power available to both producers and consumers. After discussions, therefore, with both sawmillers and the Government, it was decided that, in addition to zoning the Otago market, the declining demand throughout the country should be generally met not by attempting to impose any general reduction in production, but by refraining from opening up new State forest areas for milling by units cutting out of bush supplies in other areas. The wisdom of this decision was fully justified by the downward trend in the timber trade over 1940 and 1941, but in actual effect few mills cut out of bush, and only two are known to have ceased operations as a direct result of this policy. Incidentally, the numbers of operating mills as registered in 1939, 1940, and 1941 were recorded as 363, 365, and 358 respectively.

When Japan entered the war the demand for timber both for our own and for American requirements in this theatre of war expanded rapidly, and demand not only exceeded supply, but made heavy inroads upon the excellent stocks then in existence. By this time, however, man-power had declined so seriously in the industry that, with the concurrence of the Government and the sawmillers, the policy of refraining from opening up new State forest areas was continued, it also being agreed that the Office of the Timber Controller should not allow the shifting of mills cut out or assist in the procurement either by negotiation or direction sale of private- and Native-owned timber for the reopening elsewhere of either cut out or closed mills. With most mills under-staffed, the objective was to concentrate the limited man-power available in fewer units and thereby secure maximum production. The alternative was to follow the British policy of completely regimenting the industry, creating a number of so-called "nucleus" units in which all man-power would be concentrated, closing all others, and introducing a profit-sharing scheme to cover both operating and closed units. Such a scheme was fraught with obvious dangers and difficulties, and there can be no doubt whatsoever that the departmental policy of concentrating limited man-power in fewer mills by a natural process of elimination has achieved the objective of maximum production; its continuance has been logical until man-power surplus to the requirements of all operating units has become available.

In accordance with the usual principles of policy implementation, each case involved has been treated on its merits and quite a few excluded from the general arrangement. Typical of these were those mills wholly dependent upon local or part-time labour incapable of transfer to other mills outside their immediate locality, and in such cases either State-forest or Native-owned timber was arranged in nearby areas to allow of the shifting of the mill and its maintenance in production. Nevertheless, another two mills did cease operations in the interest of conserving man-power, making four in all similarly affected. The fact that almost 100 mills have been kept in production for each one so closed down is an answer in itself. To have agreed to the opening of new mills and of further dispersing the limited man-power available would have defeated the essential objective of maximum production.

On the basis of fact there is not even yet, with some 500 volunteers becoming available from the Pacific theatre of war, any personnel surplus to the requirements of existing units. To secure the extra timber-production now needed, at least another 1,000 men will be required before the end of 1945, and for their effective use suitable supplies of State, Native, and privately owned timber and logs, both indigenous and exotic, will be readily available as and when required to the right type of operator and the right type of mill. The wartime record of production in the face of a declining man-power and equipment position is a complete vindication of timber control, which it is claimed has operated with commendable efficiency and with less restriction and vexatious detail than timber control in any other part of the British Commonwealth.

APPENDIX I

AREAS OF STATE FOREST AS AT 31ST MARCH, 1944

Conservancy.	Permanent State Forest.		Provisional State Forest.		Totals.	Percentage of Land Area under State Forest Reservation.
	Ordinary.	National Endowment.	Ordinary.	National Endowment.		
	Acres.	Acres.	Acres.	Acres.	Acres.	
Auckland ..	400,174	89,789	135,030	14,006	638,999	7·43
Rotorua ..	659,147	289,929	138,794	63,108	1,150,978	14·57
Wellington ..	978,911	41,135	34,214	3,808	1,058,068	8·74
Nelson ..	1,060,650	216,076	785,404	526,001	2,588,131	36·93
Westland ..	916,904	354,029	362,444	227,335	1,860,712	48·16
Canterbury ..	486,401	3,647	..	..	490,048	4·92
Southland ..	536,462	56,234	633,679	13,740	1,240,115	7·3
Totals as at 31st March, 1944	5,038,649	1,050,839	2,089,565	847,998	9,027,051	13·6
	6,089,488		2,937,563			

APPENDIX II

SUMMARY OF PLANTING AND SILVICULTURAL OPERATIONS IN STATE FORESTS AS AT 31ST MARCH, 1944

Project.	Year of Commencement.	Gross Area of Forest.	Total Net Area planted.	New Area planted, 1943.	Area treated, 1943–44.			
					Low-pruned.	High-pruned.	Thinned.	Clear-felled.
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Mangonui	*	8,927	..	..	..	..	..	..
Waipoua	1925	12,600	3,831	144	120	..	3	..
Puhipuhi	1904	1,565	1,209	..	51	61	..	..
Riverhead	1926	11,965	10,593	..	193	..	..	..
Tairua	1930	48,510	13,397	48	77	..	..	..
Kauaeranga	1940	4,000	494	40	..	..	..	..
Maramarua	1928	14,087	12,311	..	40	..	2	..
Rotochu	1937	31,225	4,696	298	70	..	..	..
Whakarewarewa	1898	10,065	7,662	26	..	12	127	117
Waiotapu	1901	7,974	6,976	..	..	21	167	..
Kaingaroa	1913	346,947	259,013	15	1,549	12	17	..
Tongariro	1937	4,500	2,300	3	..	..	..	..
Erua	1930	6,648	4,350	..	3	..	..	..
Karioi	1927	25,869	17,195	..	590	3	..	..
Masterton	1942	4,695	4	1	..	..	..	..
Golden Downs	1927	28,798	22,677	262	8	..	5	..
Westland	1922	5,839	3,090	..	36	..	..	..
Hanmer	1901	10,412	7,684	..	3	..	56	..
Balmoral	1916	24,141	21,268	..	129	12	109	..
Eyrewell	1928	19,266	17,368	163	143	..	..	15
Ashley	1939	5,001	1,494	50	..	..	..	..
Naseby	1900	4,032	3,095	..	6	6	3	3
Dusky	1898	6,866	4,452	..	157	7	210	4
Conical Hill	1903	4,531	4,164	..	..	15	58	6
Blue Mountains	1925	10,058	8,872	..	136	351	..	..
Pebbly Hills	1930	5,330	4,342	..	186	5	..	..
Minor areas	1875–1939	9,303	3,143	133	90	..	25	..
Totals	..	673,157	445,680	1,183†	3,887	505	782	145

* New project. † Includes 95 acres interplanted in indigenous forest.

APPENDIX III

Creosoted Forest Produce

	Year ended 31st March, 1943.				Year ended 31st March, 1944.			
	Posts and Strainers.	Poles.	Other Creosoted Produce.	Total Quantity of Creosoted Produce.	Posts and Strainers.	Poles.	Other Creosoted Produce.	Total Quantity of Creosoted Produce.
	Number.	Number.	Cu. ft.	Cu. ft.	Number.	Number.	Cu. ft.	Cu. ft.
Produce creosoted ..	115,718	4,481	6,809	137,252	72,688	4,322	2,006	102,938
Sales	105,698	4,025	1,754	127,376	57,833	2,177	338	70,256
Creosoted produce used by State Forest Service	1,602	593	3,139	7,730	1,668	298	1,714	4,504
Creosoted stocks at end of year	29,754	2,725	1,917	38,695	39,844	5,034	561	80,299
Untreated stocks at end of year	58,845	11,628	43,482	163,690	126,227	16,246	8,771	217,147
Creosote used	93,593	22,870	7,021	123,484	56,078	24,603	2,025	82,706

APPENDIX IV

Imports of Sawn Timber and other Forest Produce

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1941–43. Value represents value in country of export, plus 10 per cent. expressed in terms of New Zealand currency. The figures for 1942 and 1943 are tentative.)

Item.	1941.		1942.		1943.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Hardwoods—	Bd. ft.	£	Bd. ft.	£	Bd. ft.	£
Sleepers	6,007,000	99,000	5,923,000	107,000	3,170,000	58,000
Australian hardwoods ..	8,947,000	161,000	6,637,000	136,200	6,304,000	150,000
Oak	788,000	21,300	Nil	Nil	Nil	Nil
Total	15,742,000	281,300	12,560,000	243,200	9,774,000	208,000
Softwoods—						
Douglas fir	2,122,000	24,200	1,151,000	18,700	3,539,000	52,200
Redwood	1,528,000	35,500	Nil	Nil	1,364,000	41,300
Total	3,650,000	59,700	1,151,000	18,700	4,903,000	93,500
Other	246,000	13,300	659,000	40,800	37,000	2,700
Grand total ..	19,638,000	354,300	13,370,000	302,700	14,714,000	304,200
Shingles	..	91	..	Nil	..	20
	Tons.		Tons.		Tons.	
Tanning-bark	972	15,246	15	219	224	1,952
Wood-pulp	7,930	173,342	2,040	48,072	2,707	61,284

APPENDIX V

Exports of Sawn Timber and other Forest Produce

(From information supplied by the Comptroller of Customs. All figures refer to the years ended 31st December, 1941–43. Figures for 1942 and 1943 are tentative.)

Item.	1941.		1942.		1943.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
				£		
	Ft. Bm.	£	Ft. Bm.	£	Ft. Bm.	£
White-pine	835,000	8,200	334,000	3,768	136,900	1,670
Rimu	13,960,000	143,800	5,484,000	61,579	2,261,000	25,499
Beech	1,273,000	18,700	142,000	2,341	719,000	11,650
Matai	213,000	2,400	31,000	370	77,700	938
Kauri	55,000	2,500	50,000	2,295	17,700	847
Insignis pine	2,680,000	43,900	1,469,000	24,326	1,159,000	19,675
Other New Zealand ..	12,000	500	2,000	132	19,900	683
Foreign	38,000	600	36,000	1,221	148,200	11,665
Total	19,066,000	220,600	7,548,000	96,032	4,539,400	72,597
	Tons.		Tons.		Tons.	
Kauri-gum	1,421	88,643	1,061	74,737	590	14,528
Fungus	24	2,911	..	..	..	..

APPENDIX VI

PAYMENTS AND RECEIPTS FOR THE YEAR ENDED 31ST MARCH, 1944

Item.	1943–44.	1942–43.	1941–42.	1940–41.
Payments	£	£	£	£
Allocation of revenue—				
Consolidated Fund (portion of revenue from national-endowment forests)	17,455	16,721	20,442	16,151
Working Railways Account (section 24 (1), Finance Act, 1936)	549	898	1,151	1,567
Local bodies	12,928	14,767	17,080	16,593
General management charges—				
Salaries	89,332	79,793	81,667	77,834
General expenses	41,254	34,370	28,458	31,070
Land purchase	11,687	25,307	1,996	6,788
Forestry projects under direct management—				
Exotic	248,705	220,598	183,561	234,794
Indigenous	30,521	22,945	35,376	32,724
Utilization: Sawmill, creosote plant, &c. ..	104,826	100,720	136,090	148,545
Miscellaneous: Expenses of raising loans and interest on temporary advances	..	..	978	911
Totals	557,257	516,119	506,799	566,977
Receipts				
Indigenous-forest receipts—				
Timber sales	114,553	134,396	127,926	120,753
Timber royalties and trespass	8,588	9,467	9,532	8,539
Leases, grazing	1,402	1,492	1,523	1,558
Sawmill-sites, industrial, &c.	247	239	329	402
Miscellaneous	6,895	8,017	8,274	6,937
Log sales from managed forests	73,317	30,596	31,296	26,153
Exotic forests: Poles, posts, firewood, &c. ..	51,952	54,234	15,341	13,207
Utilization projects—				
Sawn timber	16,180	40,607	45,815	28,948
Creosoted products	15,964	23,637	19,262	7,996
Box shooks	136,600	79,109	32,883	..
Miscellaneous	2,663	4,767	3,642	2,470
Miscellaneous credits	16,942	13,371	9,800	52,102
Totals	445,303	399,932	305,623	269,065
Receipts from national-endowment indigenous forests (included in above)	46,654	48,289	45,374	27,408

APPENDIX VII

Sawmilling and Sash and Door Manufacturing, 1942–43

Provincial District.	Character of Organization.							Persons engaged in connection with Felling, Hauling, &c.						Persons engaged in connection with Production of Sawn Timber from Logs.							
	Number of Mills or Establishments.	Individual.	Partnership.	Registered Company. Public.	Registered Company. Private.	Co-operative and Miscellaneous.	Government.	Proprietors actively engaged.	Managers, Overseers, &c.	Accountants, Clerks, &c.	Wage-earners.	Contract.	Total.	Proprietors actively engaged.	Managers, Overseers, &c.	Accountants, Clerks, &c.		Wage-earners.	Contract.	Total.	
								M.	M.	M.	M.	M.	M.	M.	M.	M.	F.	M.	M.	M.	F.
Auckland ..	130	22	23	28	55	..	2	14	28	3	541	90	676	27	77	57	31	1,227	47	1,435	31
Hawke's Bay ..	21	3	3	4	11	..	..	1	4	..	57	16	78	5	9	5	1	115	..	134	1
Taranaki ..	27	5	1	6	14	1	..	..	4	..	212	14	230	1	18	8	3	259	..	286	3
Wellington ..	57	11	2	5	39	..	..	2	13	..	222	13	250	6	28	13	4	322	7	376	4
Marlborough ..	8	3	3	..	2	..	..	..	1	..	11	3	15	2	2	..	..	13	..	17	..
Nelson	52	8	14	2	27	1	..	10	6	1	243	12	272	12	25	2	1	234	..	273	1
Westland ..	34	1	4	1	28	..	..	2	22	4	332	28	388	4	26	14	5	338	43	425	5
Canterbury ..	34	8	6	2	18	..	..	2	..	..	23	4	29	8	6	2	1	108	..	124	1
Otago																					
Otago portion ..	22	3	2	4	12	1	..	2	5	1	44	..	52	2	5	..	..	65	..	72	..
Southland portion	37	6	3	..	28	..	..	6	9	3	204	1	223	6	19	10	6	255	..	290	6
Totals, 1942–43	422	70	61	52	234	3	2	39	92	12	1,889	181	2,213	73	215	111	52	2,936	97	3,432	52
„ 1941–42	458	87	74	51	242	4	..	54	91	6	1,966	297	2,414	92	223	128	40	3,028	64	3,535	40
„ 1940–41	467	88	79	48	249	3	..	48	66	6	2,069	329	2,518	120	225	135	36	3,202	88	3,770	36

Provincial District.	Persons engaged in connection with Resawing, Dressing, &c.									Persons engaged in connection with Total.									Salaries and Wages paid to Persons engaged in connection with Felling, Hauling, &c.	Salaries and Wages paid to Persons engaged in connection with Production of Sawn Timber from Logs.		Salaries and Wages paid to Persons engaged in connection with Resawing, Dressing, &c.		Salaries and Wages paid to Persons engaged in connection with Total.	
	Proprietors actively engaged.	Managers, Overseers, &c.	Accountants, Clerks, &c.	Wage-earners.		Contract.	Total.			Proprietors actively engaged.	Managers, Overseers, &c.	Accountants, Clerks, &c.	Wage-earners.		Contract.	Total.									
	M.	M.	M.	F.	M.	F.	M.	M.	F.	M.	M.	M.	F.	M.	F.	M.	M.	F.	M.	M.	F.	M.	F.	M.	F.
																			£	£	£	£	£	£	£
Auckland ..	3	51	35	30	709	16	..	798	46	44	156	95	61	2,477	16	137	2,909	77	237,588	473,262	4,799	252,689	7,443	963,539	12,242
Hawke's Bay ..	1	4	4	1	57	..	..	66	1	7	17	9	2	229	..	16	278	2	28,277	45,761	315	20,379	135	94,417	450
Taranaki ..	1	6	5	3	87	1	..	99	4	2	28	13	6	558	1	14	615	7	74,592	91,894	338	30,897	642	197,383	980
Wellington ..	1	21	19	11	232	..	..	273	11	9	62	32	15	776	..	20	899	15	84,665	126,160	802	78,201	1,688	289,026	2,490
Marlborough ..	..	..	..	..	..	..	..	..	..	2	3	..	..	24	..	3	32	..	4,037	4,868	..	..	..	8,905	..
Nelson	2	7	3	2	71	4	..	83	6	24	38	6	3	548	4	12	628	7	88,314	90,135	233	26,335	659	204,784	892
Westland ..	..	1	..	1	9	..	..	10	1	6	49	18	6	679	..	71	823	6	141,430	144,830	689	3,406	155	289,666	844
Canterbury ..	4	14	15	10	212	..	..	245	10	14	20	17	11	343	..	4	398	11	8,517	34,980	100	69,958	1,516	113,455	1,616
Otago—																									
Otago portion ..	1	12	9	11	115	..	..	137	11	5	22	10	11	224	..	..	261	11	17,081	23,454	..	41,687	1,643	82,222	1,643
Southland portion	1	4	3	3	64	1	..	72	4	13	32	16	9	523	1	1	585	10	70,819	91,806	629	20,115	419	182,740	1,048
Totals, 1942–43	14	120	93	72	1,556	22	..	1,783	94	126	427	216	124	6,381	22	278	7,428	146	755,320	1,127,150	7,905	543,667	14,300	2,426,137	22,205
„ 1941–42	20	123	103	56	1,762	5	3	2,011	61	166	437	237	96	6,756	5	364	7,960	101	703,235	1,023,388	5,752	543,706	9,333	2,270,329	15,085
„ 1940–41	22	121	123	53	1,776	..	2	2,044	53	190	412	264	89	7,047	..	419	8,332	89	701,309	1,026,008	4,754	534,962	7,976	2,262,279	12,730

APPENDIX VII.—*continued*

Sawmilling and Sash and Door Manufacturing, 1942–43—*continued*

Provincial District.	Expenses of Operation, other than Salaries and Wages and Cost of Materials.																						Cost of Materials used or operated upon.			
	Production of Logs at Mill.							Production of Sawn Timber from Logs.							Resawing, Dressing, and Manufacturing from Sawn Timber.										
	Rent.	Cost of Power.	Fire and Accident Insurance (Premiums).	Depreciation.	Repairs.	Other Expenses.	Total.	Rent.	Cost of Power.	Fire and Accident Insurance (Premiums).	Depreciation.	Repairs.	Other Expenses.	Total.	Rent.	Cost of Power.	Fire and Accident Insurance (Premiums).	Depreciation.	Repairs.	Other Expenses.	Total.	Stumpage.	Logs purchased.	Rough-sawn Timber purchased and other Materials.	Total.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Auckland ..	885	13,625	10,753	26,960	62,548	47,755	162,526	3,706	15,333	22,818	31,997	59,474	64,750	198,078	5,161	9,763	12,573	12,278	27,426	29,615	96,816	128,068	255,024	1,037,402	1,420,494
Hawke's Bay ..	35	2,408	1,274	2,365	2,834	2,250	11,166	6	1,385	2,436	1,793	3,516	5,572	14,708	144	667	1,149	1,085	1,285	2,715	7,045	15,239	7,587	77,509	100,335
Taranaki ..	123	2,513	3,968	11,714	18,869	1,117	41,304	823	1,379	4,385	4,560	12,483	4,609	28,239	349	1,390	2,392	1,490	2,922	3,999	12,542	33,262	22,302	53,599	109,163
Wellington ..	184	4,598	3,394	7,736	19,343	4,150	39,405	704	3,254	6,805	4,913	16,748	10,431	42,855	1,563	3,470	4,436	4,467	5,834	7,153	26,923	55,205	24,111	290,625	369,941
Marlborough ..	..	550	246	458	620	398	2,272	22	269	232	315	467	953	2,258	..	..	..	..	..	..	..	1,330	..	..	1,330
Nelson ..	158	7,256	4,082	8,644	17,901	8,866	46,907	1,325	3,963	4,384	5,096	11,861	6,828	33,457	689	1,344	708	1,125	726	3,110	7,702	32,170	1,076	75,062	108,308
Westland ..	1,065	9,344	7,220	9,171	17,475	14,537	58,812	1,298	4,932	8,170	6,822	14,988	13,515	49,725	140	190	205	68	197	160	960	43,656	2,290	14,163	60,109
Canterbury ..	167	3,278	473	415	1,403	790	6,526	267	3,552	2,056	1,166	4,326	5,447	16,814	969	3,479	4,938	3,501	5,594	4,149	22,630	11,458	33,041	215,363	259,862
Otago—																									
Otago portion ..	..	1,041	1,060	1,110	4,564	522	8,297	235	418	1,781	1,567	3,715	2,405	10,121	1,862	1,991	2,425	2,897	2,349	5,114	16,638	5,438	..	105,024	110,462
Southland portion	591	3,887	3,939	4,144	13,182	4,319	30,062	829	1,887	4,144	3,218	8,551	6,742	25,371	205	863	1,325	1,705	2,402	2,514	9,014	20,508	2,454	83,660	106,622
Totals, 1942–43	3,208	48,500	36,409	75,717	158,739	84,704	407,277	9,215	36,372	57,211	61,447	136,129	121,252	421,626	11,082	23,157	30,151	28,616	48,735	58,529	200,270	346,334	347,885	1,952,407	2,646,626
,, 1941–42	2,571	43,871	33,023	85,746	128,604	76,424	370,239	10,451	30,340	49,186	53,533	112,012	118,042	373,564	16,133	21,447	29,770	26,818	39,851	64,088	198,107	350,689	180,378	1,976,746	2,507,813
,, 1940–41	3,449	43,427	32,731	77,675	107,420	95,817	360,519	7,939	24,584	49,886	57,032	115,398	129,117	383,956	16,799	20,480	27,528	27,747	38,987	59,663	191,204	325,129	228,501	1,775,156	2,328,786

Provincial District.	Total Costs of Operation (including Salaries and Wages).				Products.														
					Log Sawmill Products.				Resawing and Planing-mill Products.										
	Felling, Hauling, and Delivering Logs at Mill.	Production of Sawn Timber from Logs.	Resawing, Dressing, and Manufacturing from Sawn Timber.	Total.	Rough-sawn Timber. Quantity.	Rough-sawn Timber. Value.	Laths, Posts, Waste Products, &c.	Total.	Planed Flooring, Skirting, Moulding, &c. Quantity.	Planed Flooring, Skirting, Moulding, &c. Value.	Sashes and Doors.	Joinery.	Butter-boxes.	Cheese-crates.	Fruit-cases.	Other Products.	Total.	Total Value of all Products.
	£	£	£	£	Ft. B.M.	£	£	£	Ft. B.M.	£	£	£	£	£	£	£	£	£
Auckland	555,777	903,568	1,394,350	2,853,695	126,949,060	1,467,275	69,922	1,537,197	31,685,412	712,880	149,674	127,238	165,256	25,589	35,118	299,426	1,515,181	3,052,378
Hawke's Bay	56,742	66,311	105,068	228,121	13,628,034	145,494	1,085	146,579	2,186,861	47,457	2,000	2,110	13	6,150	29,423	15,186	102,339	248,918
Taranaki	151,815	140,116	97,680	389,611	29,758,146	303,318	4,680	307,998	2,566,771	50,266	8,032	18,787	..	14,422	..	10,940	102,447	410,445
Wellington	182,015	191,188	397,437	770,640	35,529,647	402,830	3,201	406,031	12,270,486	267,180	10,709	35,081	14,215	15,218	24,745	46,514	413,662	819,693
Marlborough	7,639	7,126	..	14,765	1,240,102	15,538	189	15,727	..	..	..	..	..	..	..	..	..	15,727
Nelson	168,237	124,055	109,758	402,050	33,808,547	310,404	4,204	314,608	960,745	19,892	3,688	3,681	4,088	2,162	60,212	24,011	117,734	432,342
Westland	243,898	197,534	18,684	460,116	54,595,056	514,008	1,405	515,413	1,320,537	17,830	..	..	1,515	..	..	815	20,160	535,573
Canterbury	27,316	84,120	309,467	420,903	11,628,969	108,963	2,380	111,343	7,316,681	163,691	9,107	36,315	3,227	3,351	20,446	114,551	350,688	462,031
Otago—																		
Otago portion ..	30,816	33,575	164,992	229,383	8,422,242	77,731	1,353	79,084	3,675,273	84,430	14,186	16,430	..	6,281	13,449	33,541	168,317	247,401
Southland portion ..	121,389	120,260	113,208	354,857	25,954,913	261,944	..	261,944	2,314,244	41,519	..	..	490	16,555	7,838	57,491	123,893	385,837
Totals, 1942–43 ..	1,545,644	1,867,853	2,710,644	6,124,141	341,514,716	3,607,505	88,419	3,695,924	64,297,010	1,405,145	197,396	239,642	*188,804	*89,728	*191,231	602,475	2,914,421	6,610,345
,, 1941–42 ..	1,424,163	1,583,082	2,727,892	5,735,137	324,473,600	3,254,340	22,099	3,276,439	67,502,800	1,382,354	301,917	378,048	237,362	102,850	144,481	315,090	2,862,102	6,138,541
,, 1940–41 ..	1,386,957	1,643,219	2,509,298	5,539,474	342,207,800	3,289,332	19,823	3,309,155	70,023,300	1,352,662	220,323	297,861	232,399	90,325	149,741	297,474	2,640,785	5,949,940

* Butter-boxes made numbered 1,948,324; cheese-crates, 669,179; fruit-cases, 3,747,342.

Sawmilling and Sash and Door Manufacturing, 1942–43—*continued*

Provincial District.	Motive Power used for Hauling and Delivering. Kind of Engine. Steam.	Gas.	Petrol and Light Oil.	Oil (Heavy).	Electric.	Water.	Total.	Total Horse-power available.	Production of Sawn Timber from Logs. Kind of Engine. Steam.	Gas.	Petrol and Light Oil.	Oil (Heavy).	Electric.	Water.	Total.	Total Horse-power available.	Resawing, Dressing, and Manufacturing from Sawn Timber. Kind of Engine. Steam.	Gas.	Petrol and Light Oil.	Oil (Heavy).	Electric.	Water.	Total.	Total Horse-power available.	Approximate Value. Sawmill. Land and Buildings.	Tramways and Tram Plant.	Logging and Hauling Equipment.	Other Machinery	Total.	Planing and Resawing Mill. Land and Buildings.	Tramways.	Other Machinery	Total.	Total Value.
																									£	£	£	£	£	£	£	£	£
Auckland ..	71	..	111	48	1	..	231	9,670	83	1	27	15	131	1	258	7,967	16	..	3	2	499	..	520	6,558	211,209	149,968	180,569	231,447	773,193	163,577	25	135,710	299,312	1,072,505
Hawke's Bay	7	..	8	9	..	..	24	634	10	1	..	..	15	..	26	783	3	..	1	..	42	..	46	405	4,906	3,353	13,297	14,849	36,405	13,670	850	10,832	25,352	61,757
Taranaki ..	22	..	9	7	..	..	38	1,464	26	..	9	..	25	..	60	2,050	4	..	..	..	97	..	101	796	36,260	62,587	20,299	31,472	150,618	16,539	..	15,477	32,016	182,634
Wellington ..	31	..	19	17	..	1	68	1,794	27	..	5	11	16	..	59	1,456	6	..	..	5	153	..	164	1,912	24,728	23,842	30,444	48,785	127,799	61,843	..	47,476	109,319	237,118
Marlborough	1	..	3	..	..	..	4	82	3	..	1	3	..	..	7	165	..	..	..	..	..	..	..	..	1,014	..	2,089	2,994	6,097	..	..	..	..	6,097
Nelson ..	42	..	52	11	..	..	105	2,931	31	..	3	11	40	2	87	2,478	4	..	8	..	45	1	58	759	30,427	45,488	43,481	51,082	170,478	13,741	..	8,991	22,732	193,210
Westland ..	65	..	42	4	7	..	118	2,734	31	1	3	10	30	..	75	2,710	2	..	..	..	6	..	8	122	41,691	66,505	34,909	49,331	192,436	1,990	..	1,538	3,528	195,964
Canterbury	..	..	6	1	19	..	26	372	2	..	1	2	48	..	53	1,059	3	..	..	42	171	1	217	1,807	9,055	700	3,614	10,255	23,624	52,840	..	28,130	80,970	104,594
Otago—																																		
Otago portion	11	1	10	1	..	..	23	392	12	..	..	..	8	..	20	427	3	..	..	3	84	..	90	1,081	6,049	4,041	4,438	15,187	29,715	32,097	..	22,478	54,575	84,290
Southland portion	37	1	21	2	..	..	61	1,004	28	..	4	..	2	..	34	675	3	..	..	..	40	..	43	510	17,508	22,572	14,402	30,091	84,573	7,912	118	18,147	26,177	110,750
Totals—																																		
1942–43	287	2	281	100	27	1	698	21,077	253	3	53	52	315	3	679	19,770	44	..	12	52	1137	2	1247	13,950	382,847	379,056	347,542	485,493	1,594,938	364,209	993	288,779	653,981	2,248,919
1941–42	318	3	216	84	20	..	641	18,923	277	1	59	43	284	7	671	19,392	47	..	2	55	1219	2	1325	14,304	342,310	380,330	337,321	478,444	1,538,405	351,712	1,024	279,849	632,585	2,170,990
1940–41	331	..	185	69	28	2	615	16,470	284	..	59	40	254	3	640	17,356	42	..	11	4	1171	2	1230	13,635	339,681	403,547	353,907	502,351	1,599,486	400,034	14,470	278,515	693,019	2,292,505

Provincial District.	Approximate Sawn Output of various Kinds of Timber at Log-sawmills during the Year 1942–43. Number of Log-sawmills.	Kauri.	Rimu.	Kahikatea.	Matai.	Totara.	Beech.	Tawa.	Miro.	Insignis Pine.	Other and Unspecified.	Total.	Average Mill Output.	Maximum Daily Capacity of Mills (8 Hours).	Area Cut
		Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Ft. B.M.	Acres.
Auckland	99	2,645,516	69,026,740	7,931,547	7,730,658	5,421,147	12,841	1,282,324	608,172	30,639,453	1,650,662	126,949,060	1,282,314	730,622	11,193
Hawke's Bay	15	..	7,847,153	1,145,964	1,235,474	159,261	1,253	15,329	50,000	2,117,233	1,056,367	13,628,034	908,536	72,100	453
Taranaki	22	..	16,336,077	2,289,087	4,335,930	1,751,966	21,927	5,200	131,123	4,775,307	111,529	29,758,146	1,352,643	139,700	3,447
Wellington	39	..	18,039,406	1,888,048	5,765,841	4,515,268	10,705	1,320	469,616	4,699,612	139,831	35,529,647	911,017	182,400	3,078
Marlborough	8	..	710,460	104,266	57,806	1,438	123,211	..	..	210,073	32,848	1,240,102	206,684	13,000	223
Nelson	49	..	23,654,090	1,626,337	64,894	16,617	1,026,645	..	7,420	7,307,695	104,849	33,808,547	662,913	212,110	2,674
Westland	34	..	45,999,408	8,448,714	116,812	17,363	..	..	..	..	12,759	54,595,056	1,605,737	276,300	4,868
Canterbury	18	..	..	..	..	..	..	..	..	11,238,569	390,400	11,628,969	646,054	43,650	67
Otago—															
Otago portion	12	..	4,805,448	..	..	500	1,000,000	..	..	2,586,632	29,662	8,422,242	701,854	56,000	730
Southland portion ..	34	..	12,567,132	923,493	30,977	100,192	8,731,793	..	108,846	3,492,480	..	25,954,913	763,380	150,800	1,922
Totals, 1942–43 ..	330	2,645,516	198,985,914	24,357,456	19,338,392	11,983,752	10,928,375	1,304,173	1,375,177	67,067,054	3,528,907*	341,514,716	1,034,893	1,876,682	28,655
„ 1941–42 ..	358	2,561,300	192,608,600	29,732,900	18,672,300	10,456,300	9,326,600	1,116,200	1,827,900	56,246,900	1,924,600	324,473,600	906,400	1,957,063	27,687
„ 1940–41 ..	365	3,048,208	204,272,555	31,849,459	22,391,669	12,980,219	9,326,138	1,536,522	2,132,145	53,445,243	1,225,686	342,207,844	937,555	1,944,524	27,100

* Details for 1942–43 include poplar, 1,104,661 ft. b.m.; stringy bark, 653,463 ft. b.m.; blue gum, 487,735 ft. b.m.; taraire, 270,295 ft. b.m.; rata, 159,902 ft. b.m.; pukatea, 156,704 ft. b.m.; tanekaha, 75,894 ft. b.m.; hinau, 73,893 ft. b.m.; rewarewa, 64,688 ft. b.m.; yellow pine, 45,912 ft. b.m.; puriri, 40,688 ft. b.m.; macrocarpa, 35,216 ft. b.m.; other and unspecified, 360,461 ft. b.m.

GLOSSARY

1. Indigenous

(*a*) *Softwoods:*—
Kauri (*Agathis australis*).
Matai (*Podocarpus spicatus*).
Miro (*Podocarpus ferrugineus*).
Rimu (*Dacrydium cupressinum*).
Silver-pine (*Dacrydium colensoi*).
Tanekaha (*Phyllocladus trichomanoides*).
Totara (*Podocarpus totara*).
White-pine (*Podocarpus dacrydioides*).

(*b*) *Hardwoods:*—
Beech (*Nothofagus* spp.).
Black-maire (*Olea cunninghamii*).
Mangeao (*Litsaea calicaris*).
Manuka (*Leptospermum* spp.).
Northern rata (*Metrosideros robusta*).
Pukatea (*Laurelia novæ-zelandiæ*).
Red-beech (*Nothofagus fusca*).
Rewarewa (*Knightia excelsa*).
Silver-beech (*Nothofagus menziesii*).
Tawa (*Beilschmiedia tawa*).

(*c*) *Other:*—
Kauri-grass (*Astelia trinervia*).
Miniature tree-fern (*Blechnum fraseri*).
Shoe-string fungus (*Armillaria mellea*).

2. Exotic

(*a*) *Softwoods:*—
American eastern white-pine (*Pinus strobus*).
Araucaria (*Araucaria* spp.).
Austrian pine (*Pinus austriaca*).
Corsican pine (*Pinus laricio*).
Douglas fir (*Pseudotsuga taxifolia*).
Insignis pine (*Pinus radiata*).
Jack pine (*Pinus banksiana*).
Jeffrey's pine (*Pinus jeffreyi*).
Larch (European) (*Larix decidua*).
Lawson's cypress (*Cupressus lawsoniana*).
Loblolly pine (*Pinus taeda*).
Lodgepole pine (*Pinus murrayana*).
Monterey cypress (*Cupressus macrocarpa*).
Northern pitch-pine (*Pinus rigida*).
Ponderosa pine (*Pinus ponderosa*).
Prickly-cone pine (*Pinus muricata*).
Scots pine (*Pinus sylvestris*).
Sugar-pine (*Pinus lambertiana*).
Western red-cedar (*Thuya plicata*).

(*b*) *Hardwoods:*—
Ash (*Fraxinus excelsior*).
Australian hardwoods, principally *Eucalyptus* spp.
Boxwood (*Buxus* spp.).
Common alder (*Alnus glutinosa*).
Lignum vitæ (*Guaiacum* spp.).
Mahogany (*Swietenia mahagoni*).
Mamalava (*Planchonella samoensis*).
Oak (*Quercus* spp.).
Red-alder (*Alnus rubra*).
Sycamore (*Acer pseudoplatanus*).
Walnut (*Juglans nigra*).
White stringy-bark (*Eucalyptus eugenioides*).
Mountain ash (*Eucalyptus regnans*).
South American beeches (*Nothofagus procera* and *Nothofagus obliqua*).

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