

In conformity with the foregoing policy it is planned to establish with exotic species during the next five years a total of about 82,000 acres, of which 49,000 acres are already available for this work, leaving 33,000 acres—most of which is Crown land—to be acquired for the completion of the programme. The number of trees to be raised for this planting effort is estimated at one hundred and thirteen million, and the inclusion of a wide variety of species will have the desired effect of still further reducing the percentage of State exotic forests carrying *Pinus radiata*. At the completion of the programme not only will most of the principal administrative units be consolidated, but the State exotic stands, with their present acreage of over 428,000 acres, will attain a grand total of over 500,000 acres.

Indigenous Forests.

It is planned to inaugurate an active programme of reafforestation of indigenous forests with exotics. Hitherto such work has been entirely of an experimental nature, but the results have proved sufficiently promising to warrant a five-year programme totalling approximately 16,000 acres, 2,000 acres of which will be in the Auckland Forest-conservation Region, and 4,000 acres, 7,000 acres, and 2,000 acres respectively in the Rotorua, Wellington, and Otago-Southland Forest-conservation Regions, with minor acreages in the Nelson-Marlborough and Westland Regions. The number of trees required to complete this programme is estimated at eight million.

The outstanding features of the indigenous forest situation are that most of the commercial forests are in a stagnant or overmature condition in which net growth is offset by decay, and that they are being worked over at the rate of between 30,000 acres and 40,000 acres per annum without any provision for their re-establishment. To the extent that these forests are being protected against fire and wasteful use, they are being conserved, but the ultimate objective of converting them into a state of maximum productivity as rapidly as possible must be kept steadily in view, and the current programme of national-forest works inaugurates far-reaching administrative reforms which are directed towards the long-term objective of converting those stagnant or overmature virgin stands into healthy and productive forests.

SILVICULTURE.

Exotic Forests.

The essential silvicultural operations upon which hitherto the State Forest Service has concentrated its energies have been the clearing and underscrubbing in the older exotic forests. These operations, largely carried out with the assistance of unemployment funds, have materially reduced the fire risk and will facilitate future improvement cuttings. A commencement has been made likewise with the pruning of selected final crop trees in the older stands. Generally speaking, the work has been confined to the pruning of dead branches, but observational prunings of green branches have also been undertaken, and experiments are still proceeding with a wide variety of pruning-implements ranging from hand secateurs to heavy pole saws.

With the establishment of State sawmills, box-factories, and creosoting-plants, &c., in the State exotic forests a wide field of silvicultural operations becomes practicable within the next five years. The proposed programme of national-forest works provides for blanking, underscrubbing, thinning, and pruning operations over a total area of 336,000 acres, as compared with the treatment of less than 70,000 acres during the previous history of the Service. This work is estimated to necessitate the employment of an average of six hundred men for the whole of the five-year period.

Of equal importance with the development of improvement-cutting technique is the problem of harvesting the final crop and re-establishing the exotic forests. The necessity for a comprehensive study of cutting systems and of the relative advantages of natural regeneration and replanting is of such basic importance that, coupled with considerations of fire protection, it has been decided to introduce a policy of selling logs and other raw material. This policy of log sales follows European forestry practice, and will not only expedite the development of improvement-cutting and re-establishment technique, but will also facilitate protection against fire.

Indigenous Forests.

While little silvicultural investigative work has been possible in the indigenous forests during the past twenty years, a considerable amount of silvicultural knowledge has been accumulated as a result of observations made in connection with routine protection, cruising, and logging work. There is now little doubt that one of Nature's principal methods of perpetuating the high forests of the Dominion is through wind-throw, whereby mineral soil is exposed and the proper conditions created for the replacement of the overmature forest giants of kauri, rimu, white-pine, &c., by a crop of seedlings of these valuable species. While, therefore, the existing policy of clear cutting over-mature forest and protecting thereafter from fire is not far removed from Nature's management, it is just as certain that it does not facilitate the prompt re-establishment of the commercial species.

There are two conclusions of importance. The first is that a comprehensive study must be initiated into the silvicultural characteristics of the principal commercial species, more especially of kauri, rimu, and silver-beech. Many decades must pass before such a study can be perfected, but considerable progress can be achieved even in the early years by investigating the raising of young trees from seed. This is not to indicate that large-scale artificial re-establishment is contemplated. The work is intended primarily to afford a working knowledge of the behaviour of the seeds and seedlings with a view to developing adequate silvicultural methods for natural regeneration.

The second, of even greater importance, is the conclusion that in all commercial forests carrying a good stocking of young or immature timber no logging should be allowed except under strict silvicultural measures. So small a percentage are these forests of the total commercial stands that their conservation should form the keynote of the indigenous-forest policy, as they must be considered a vital factor in the early development of an indigenous silvicultural technique.