

## CHAPTER IV.—RESEARCH AND EXPERIMENTS.

## 1. FOREST-MANAGEMENT.

## ÉCOLOGICAL AND SILVICAL RESEARCH.

These investigations begun in the kauri forests and the Westland rain forest in 1920, and in the beech forests early in 1923 are revealing more clearly as the work progresses the immensity of our indigenous-forest problems. The broad aim of forest research is to obtain, by means of observation, experiment, repeated tests, and careful records of results and conditions, a sound knowledge of what our forest land can be made to grow most profitably. The ultimate field of silvical, ecological, and silvicultural research is the economic production of wood-tissue. The technique of wood-production cannot be attempted on scientific lines until technical ecological knowledge is crystallized regarding the optimum habitat conditions for forest-trees, and until silvical or forest-botanical facts are observed, noted, and summarized into guiding principles upon which to base the art and science of silviculture. In furthering the solution of these practical problems valuable progress has been made during the past year.

*Beech Forests.*

In February, 1923, Dr. L. Cockayne, F.R.S., &c., honorary botanist to the State Forest Service, commenced a survey of the ecology and silvics of our beech forests, to which we must look for the major part of our indigenous hardwood supplies. During the six weeks' field-work that Dr. Cockayne had accomplished by the 31st March, 1923, many observations were noted in Westland and western Nelson pointing to the sound establishment of important general principles upon which the Service will have to base the technical management of beech forests for sustained timber-production.

"It is clear," reports Dr. Cockayne, "that much beech forest has been felled and burned which should never have been destroyed, as testified by the total failure to establish grass, and erosion having in many places become a menace to traffic on important roads. Beech-forest lands on upland slopes should be thrown open for settlement only after the fullest expert inquiry, and the removal of forest on steep slopes bordering on highways should not be permitted without the most careful consideration. Regarding regeneration, in all classes of beech forest where the old trees are dying out, and where trees have been felled, natural regeneration is in rapid progress; and while the effect of complete burning is most harmful in destroying the humus and leading to the appearance of a new plant association, frequently mainly bracken-fern, the evidence supplied by these recent studies and of my previous observations indicates that primitive beech forest can be cheaply maintained for a long period as commercial milling-forest. The forest rangers who accompanied me showed great capabilities for the work and were full of enthusiasm and eager to learn."



NATURAL REGENERATION OF BEECH FOREST.

The young growth has come away since the area was fenced from stock.  
(Mount Torlesse, Canterbury, alt. 1,200 ft.)

[L. Cockayne, photo.]