

Forestry Journey to New Zealand¹

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OVER the years I have followed forestry developments in New Zealand particularly in regard to softwood afforestation. I had many discussions about New Zealand with Professor Denis Richardson when he was at Bangor. He argued that what was happening in New Zealand was important for Ireland and that Irish forestry would be affected by events occurring at the other side of the world. He also argued that the future will see an increasing replacement of currently used industrial timbers by synthetic materials, by timbers from developing countries and by produce from man-made forests growing on short rotations in regions or countries climatically better suited to plantation type forestry than most European countries. New Zealand had led the way in this regard and he convinced me that the experience of both State and private forest enterprise in New Zealand, where the management and approach was highly professional, would be worth examining and should have relevance to production forestry here.

In the early part of 1975 I had the opportunity to go to Australia, New Zealand and Malaysia on a 10-week study tour in connection with our Faculty curriculum development project. Each of these countries had something special to offer in the field of new developments in third level forestry education. The tour to Australia was financed by a generous grant from the Kellogg Foundation. A supplementary grant from the Forest and Wildlife Service enabled me to extend my trip and to have a special look at forestry and forest enterprises in New Zealand. It is, mainly, with this aspect of my tour that I propose to deal in this paper.

First Australia. I had an excellent opportunity to look at forestry and forest enterprises in Australia especially in Victoria. I will start with a brief account from there.

It is important to recognise that Australia is a very big country — 76 million hectares in size. "A giant desert fringed with Eucalypts and Australians".

There are however, high rainfall coastal belts with large areas of

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forest land suitable for high yielding economic timber production and this resource will be of increasing significance in the future. The indigenous forest, mainly eucalypt, which comprises 99% of the total forest area produces about 10 million cubic metres of commercial wood annually. Exotic conifer plantations, mainly pine, which at 500,000 ha, account for 1% of the total productive forest area, produces 20% of the current total removals.

Plantation forestry is of increasing importance to Australia in general and Victoria in particular. Australia imports large amounts of conifer wood, perhaps 25% of its timber needs, in the form of sawnwood and woodpulp mainly from New Zealand and U.S.A. Federal policy in Australia encourages self-sufficiency in softwood timber production and to this end Canberra gives financial support to the State Forestry Services for their conifer planting programmes. These pine plantations are concentrated in the high rainfall regions particularly in New South Wales and Victoria, on selected accessible sites, on abandoned farmland and increasingly on cleared eucalypt forest. The agreed national area to be planted annually is 30,000 ha, and the target is $1\frac{1}{4}$ million ha, by the year 2000. This large scale afforestation with *Pinus radiata* has been influenced by the success of plantation forestry in New Zealand and by the growing demand for industrial wood at home and in S. East Asia in general. The impact of this expanding exotic forest on the landscape is quite considerable and its critics are quite vocal. Foresters are increasingly exercised to ensure that landscape values, wildlife values and native vegetation reserves are preserved. Australia is one of the most highly urbanised societies in the developed world and issues such as the effects of forestry activities on scenery, wildlife, water-catchments and recreation can readily arouse controversy. The Australian Forestry Council, a Federal Body established in 1964, which seeks to co-ordinate forest policy and especially the exotic conifer production policy through grants and agreed programmes and the State Forestry Services are putting a great effort into public relations supported by excellent research and development work in the field of general conservation and recreation. There are well financed and staffed research programmes in hydrology and wildlife in each State. I was able to study these developments at first hand in the State of Victoria.

FORESTRY IN VICTORIA

An extensive tour of Victoria was arranged by the head of the Research and Educational Division of the Forests Commission, Mr. John Jack. The tour covered aspects of harvesting and milling

of eucalypts, silviculture of indigenous forests and exotics, and forest based industrial development in the important timber areas of the State notably the eastern and north eastern regions. A tour to western Victoria included Creswick Forest College, near Ballarat, and the Grampian State Forest, an area of 200,000 hectares managed mainly for recreation, conservation and possessing many sites of historical value and unique wildlife features.

Over $\frac{1}{3}$ of Victorian land of 24 million ha is still under forest. Some 2.3 million ha is declared as reserved forest. A further 5 million ha is classified as production forest and is the responsibility of the Forests Commission. Forested and cleared free-hold land is being purchased and added to the reserved forest land at an increasing rate.

Victoria's forests are administered territorially through District Forest Offices, each under the control of a District Forester. Districts are grouped into territorial divisions headed by a Divisional Officer.

The eastern and north eastern regions of Victoria are the most important from a production forestry aspect. There are still sizable areas of magnificent high yielding virgin mountain ash forests that once covered large areas of the rain-rich highlands east of Melbourne. There are also large areas of natural fast growing eucalypt (mountain ash) forest regenerated after the 1939 fires which devastated $1\frac{1}{2}$ million ha in Victoria. In addition to these highly productive ash forests there are vast areas of sub-alpine woodland, shading into alpine scrub, grassland and heathland, which are of major interest from a water conservation, winter sports and also, from the wildlife and scientific aspects.

One of the main silvicultural interests in Victoria is the handling of the highly productive young stands of mountain ash. There are numerous thinning and spacing experiments for the guidance of foresters. There is also a substantial reafforestation and regeneration programme of or for the eucalypt forest, associated with clear-felling operations, particularly in the foothills and middle reaches of the mountains.

The main item of interest for me was the radiata pine plantation forestry.

The radiata pine was introduced to Victoria around 1860, mainly for shelterbelt purposes. These earlier efforts gave little idea of the commercial potential of this tree. Earlier efforts at large scale afforestation with radiata pine were often of a trial nature on difficult sites and were not always successful. A major project was undertaken in the depression years 1928 to 1938, on abandoned farmland and in mining areas to relieve unemployment. Some

30,000 ha were planted, of which 5,000 was burned in the holocaust of 1939. Some of these plantations were highly successful and are currently being harvested. Since 1966 Victoria has participated in the Australian Forestry Council's softwood afforestation programme* and had already by 1971 completed its part of the first 5-year plan of 20,000 ha. A new 5-year plan, involving a contribution from Victoria of 5,000 ha/an. was nearing completion at the time of my visit and I had the opportunity of seeing large scale pine plantations and site preparation for new pine afforestation.

Radiata pine grows remarkably well in areas like the Ovens Valley and the Forests Commission is concerned to ensure that mainly high yielding sites are planted and that adequate, suitably located land is developed of sufficient magnitude to attract large permanent forest industries. The planned plantations are expected to yield an annual 6 million cubic metres in the year 2010. They will, by then, become the main source of commercial timber in Victoria.

The increasing pressures on native forest in Victoria for uses other than timber production give emphasis and urgency to a softwood programme geared to the timber needs of the future. There is strong opposition to the further depletion of the indigenous forest and this has tended to focus critical public attention on the Softwood programme. Foresters have responded by increasing their interest and commitment in indigenous forestry and in general environmental affairs.

This issue of indigenous forest conservation is also coming to the forefront in New Zealand. Greater production of wood and higher returns on investment have been put forward as a basis for the substituting of some indigenous forest by exotic forest. More recently however the case is being made on the basis that the substitution of some indigenous forest by exotic forest and better silviculture, will relieve the threat to indigenous forests and thereby ensure their conservation. It is important that Society in general be well informed and convinced in this regard.

The process by which this substitution of eucalypt by pine is achieved can appear destructive and ugly to the uninitiated. Vast areas are denuded of indigenous vegetation by fire and clearing machinery. Young radiata are very sensitive to competition and the native eucalypt and acacias, if not eradicated, can depress production of pine markedly. In the absence of a market for the native material the trees ripped out and burned during site preparation continue to lie for years like white skeletons among the

* See p. 93.

emerging exotic pines. A recently developed industrial outlet for this waste wood heralded a welcome change, but this promising development seemed only to provoke the anti-exotic lobby in Canberra all the more. In this connection I was intrigued to observe, during my week long stay on the Canberra Campus of the N.U.A., how much the landscapers there have relied on exotics for Campus planting. European trees and North American trees such as oaks, maples and poplars seemed to predominate.

Even in the early days of colonisation naturalists were conscious of the uniqueness of the flora and fauna of the country. Botanists and zoologists were to the forefront in exploring and documenting the attractions of the new continent. During the boom gold-mining years of the fifties of the last century and after, the magnificent eucalypt forest were heavily exploited and the feeling exists today that the 'exploiters' are still actively destroying, by bulldozer and fire, what was left after the major era of land-settlement when the prime foothill forests in Victoria were extensively destroyed by axe and fire to make way for sheep and wheat. The Forest Act requires that the Commission makes provision for public recreation and for the protection of native flora and fauna in State Forests. The Forest Recreation Branch and the Service generally are doing trojan work in this regard and I was able to see in the Stawell Forest District, which covers the Grampian Range, what the Commission is doing in the field of recreation and conservation. The Grampian State forests run to 150,000 ha only a fraction of which carries timber of commercial value. The main task is one of preserving this region as a water catchment area, of protecting its native flora and fauna which includes many ancient and rare species and which is world famous as an attraction to botanists and naturalists. In addition, the provision of recreational amenities, roads, trails, picnic and camping areas goes on apace in anticipation of the mass demand that it expected over the next decade.

NEW ZEALAND

Up to the beginning of the present century the lowland indigenous forests of New Zealand were regarded as temporary occupants of land destined to be pasture. In the North Island most of the six million hectares of high quality grassland, the basis of New Zealand's famous dairying industry and the source of the country's well being, was carved out of the best areas of native forest. The process still goes on today. This policy dramatically changed New Zealand in the course of 100 years from a country rich in forest to a land of flocks and herds and naked rolling grasslands.

It comes as a surprise, therefore, to find that forestry in New Zealand ranks today as one of the most important of the nation's primary industries. More important still, from our point of view, is to recognise that this is based, not on the further exploitation of rich native forest, but on the systematic harvesting of man-made exotic softwood plantations arising from afforestation programmes on waste land in the 1920's and 1930's.

The Eastern central area of the North Island, the Kaingoroa plains region, is one vast pine forest with great forest products industries and flourishing new towns and cities. This is a worthwhile place to visit for anyone wishing to see the fruits of plantation forestry.

Within a 40-mile radius of Rotorua, a region famous for its volcanic features and Maori culture, a great exotic forest of 300,000 ha, mainly *Pinus radiata*, blankets the countryside. At the beginning of the present century this was a vast desolate expanse of wasteland covered with *Leptospermum scoparium* and bracken, an area shunned by stock farmers because of a mysterious bush sickness (now known to be caused by cobalt deficiency). This region was relatively free of native forest due to repeated bush fires and partially because of repeated volcanic eruptions which had covered the region with layers of volcanic ash.

Around 1900 the Forestry Branch of the newly established New Zealand Department of Lands started to experiment with tree planting in this region. The first efforts were puny and were mainly concentrated on abandoned farmland using European trees such as European larch and Corsican pine. Later, American species were increasingly used. This early planting was often done by convict labour. Already by 1913 the potential of *radiata pine* for shelterbelt purposes was recognised by farming interests and some small farm woodlots were laid down using this fast growing exotic.

From these small beginnings has grown one of the world's most remarkable forestry enterprises. By 1974 the region was yielding 70 million m³ of commercial timber and supporting a remarkable array of forest products and industrial complexes rivalling anything to be found elsewhere in the world. This region and these forest industries account for 10% of the country's industrial production and is marked by flourishing communities in new towns with strange sounding names, such as Murupara, Taupo, Whakatani and Kaweru. The inhabitants of these towns are mainly forestry workers or employed in forest based industries or are in service of contracting firms. The new town population is mainly of Maori or Cook Island stock and I understand that without this excellent work force it would be most unlikely that the progress achieved

would have been possible. The town of Tokoroa, for example, which in 1975 had a population approaching 25,000 would shortly receive city status, was not on the map 25 years previously. The inhabitants of this well laid out town are largely recent immigrants from the Cook Islands, a New Zealand dependancy. The houses are built by, and on land owned by New Zealand Forest Products and their living is earned in the Company's vast Kinleith Plant nearby, and in the Company's extensive plantations which surround the town.

THE FOREST PRODUCTS COMPANY

A visit to this remarkable private industry, New Zealand Forest Products Ltd., was one of the highlights of my tour. I learned that this company arose as a result of a remarkable forest bond selling effort in the 1920's and 1930's. The success of this promotion was influenced at the time by the almost unlimited availability of unoccupied and unallocated land which could be acquired for 50p per acre, and by the large pool of rural and suburban unemployed available in the early years of the 'hungry' thirties.

Between 1924 and 1934 some 250,000 ha were planted by State and Company effort on the Kaingoroa plains. An annual rate of 20,000 ha was reached in the peak years of the early thirties.

Early professional commentators condemned this "mad-cap" scheme. From a technical, silvicultural and long term management point of view the whole scheme left a lot to be desired. In the early days it would appear that the fears expressed in the worst prognostications would be fulfilled. Little in the way of regular post-planting tending, beating and clearing was provided. Very alarming outbreaks of *Sirex* occurred in the early pole stage and later massive attacks of fungus blight threatened when the talisman of real success was nearest and most inviting. The worst never happened.

At Kinleith, personnel of the Forestry Division of this remarkable forestry enterprise demonstrated their novel working plan system with its impressive information storage and retrieval facility and the massive use of aerial photography and computerisation for field management with instant availability to all concerned of each and every stand and operation. The future too is taken care of by the Forest Simulation System, which monitors the resources and forecasts the future states and patterns of the forest under different user patters and provides options and information on the source and nature of the future cut. These forecasts, based on the new simulation techniques, are used by the Management Board to help in long term planning, industrial and silvicultural.

There is much in common between Company and State Forestry in this part of New Zealand. The whole development is profoundly influenced by the dynamic management at Kinleith and by the work of the New Zealand Forest Service Research Institute at Canberra. The Institute not only carries out research but organises symposia at which all the ideas and experiences from all the regions practising this type of forestry, mainly New Zealand, Australia, South Africa, Kenya and so on are presented and discussed. The published proceedings are remarkable and are a mine of information.

Kaingaroa Forest

No visit to this region is complete without a visit to Kaingaroa State Forest. This is the largest exotic State Forest in New Zealand and I am sure is the most important piece of forest real estate that exists today from many points of view. In this forest one sees the whole panorama of plantation forestry from the earliest penal plantations of European larch and Corsican pine planted at 1.5 m by 1.5 m by convict labour in 1910, to the large areas of *Pinus ponderosa* of bad provenance laid down in the 1920's, to the vast even-aged flourishing forest of *radiata* arising from the planting boom of the 30's. The present Kaingaroa forest originated from the planting carried out between 1901 and 1936. The great bulk of the area was planted by casual workers during the decade 1924 to 1934. In common with the Kinleith plantations, established at the same time, little in the way of follow-up treatment was possible until after 1946. Because of this, yields both in quantity and quality are said to be below the full potential of the site and the species. Nevertheless the allowed cut, based on mean annual increment of 20 cubic metres per hectare in Kaingaroa was 2.7 million m³ in 1973/74 from 120,000 ha of plantation.

The timber harvest went as follows:

To the local State Sawmill at Waipa	— 11%
To the partially State owned integrated pulp/paper/ sawmill complex at Kawerau	— 54%
To other combines and local sales	— 22%
To log exports (Japan)	— 13%

Since 1967 log exports to Japan and China have been a feature and large scale port developments have resulted from this trade. Silviculture in Kaingaroa is bound up with industrial outlets and harvesting operations. The harvesting is done by commercial

companies except in special category areas. Thinning and clear-felling of unsatisfactory stands, mainly of poor provenance *Pinus ponderosa*, is done by 'forest' labour. This accounts for 25% of the harvest.

All work under State management is on an incentive bonus scheme which was introduced with the help of industrial consultants in 1961. This initially covered harvesting of thinnings and replanting. The work has been continued by the (Forests) Work Study Section, but their main task today is dealing with contractors. 'Contractors save costs and are marginally better from a supervision and quality point of view, but take more work study time'.

As might be expected, planting and harvesting are closely integrated. Afforestation is almost exclusively with *Pinus radiata* or Douglas fir. Plant supply is highly organised and specialised, from seed collection to the 2 year radiata seedling which is standard planting stock. The annual planting programme at Kaingoroa is 4,500 ha. About 1,000 ha of this is new planting. The rest is reafforestation after normal clear-felling or the clearing of unproductive stands. New planting is concentrated on areas passed as unplantable in earlier afforestation or is on tribal land leased from the Maori people.

Acquisition of land is slow and difficult. This is now prime dairy country and the scrub covered land of the twenties, its cattle sickness problems long since resolved by the agricultural scientist, is now capable of yielding 200 lbs. of butter fat per acre per annum. Nevertheless the competing claims of forestry are actively analysed and researched by economists and there is evidence that, under certain conditions, forestry can compete with or complement dairying in the Kaingoroa plains region.

Since the main silvicultural task is one of reafforestation, or the planting of scrub covered land, there is a major investment of machinery and research into land clearing since cheap and successful establishment involves the total removal of aggressive ground vegetation and the debris of the previous crop. Burning is the cheapest method but it has critics. More generally the brush and logging waste is windrowed by bulldozer and the ground is ploughed and disced before machine or hand planting.

In this context it is amazing and disturbing to see stands of inferior species like ponderosa pine with quite respectable, to my mind, volumes of merchantable timber being crushed down by giant rollers and burned to make way for the more productive *Pinus radiata*.

Natural regeneration which at one time was very profuse in maturing radiata stands and was an accepted method of restocking

is now being phased out completely. Trials are currently under way to discover the most efficient means of eliminating regeneration before planting. Planting is cheaper and tending of properly spaced trees can be mechanised. Nursery planting stock is better genetically and nursery trees are able to respond more rapidly and are more vigorous than the trees released from heavily overstocked regeneration.

The massive machinery used on the harvesting and extraction operations results in the compaction of large areas of ground. These compacted soils have to be ripped, fertilised and cultivated before planting, and specially selected vigorous trees used to ensure that growth on such damaged sites is consistent with the rest of the stand.

The most interesting and controversial aspect of radiata forestry in New Zealand is in the field of spacing, thinning and pruning. This can best be illustrated by the current (1975) conventional thinning schedule. (Table 1).

TABLE 1

CONVENTIONAL THINNING SCHEDULE—PINUS RADIATA
Kaingoroa State Forest

Mean Crop Ht.	Approx. age years	Pruning schedule	Thinning	Comment
1.5 m.	2-3	—	53,000 S.P. ha	Nat. Reg. only
5 m.	5	500 S.P. ha. (to 2.2 m.)	1,500 S.P. ha.	„
9 m.	7	300 S.P. ha. (to 4m.)	—	—
12m.	9	300 S.P. ha. (to 6m.)	600 S.P. ha.	All Stands
22 m.	15	—	300 S.P. ha.	1st comm. Thinning
44 m.	35		Clear-fell	

To judge from comments from research people and others and from the reports of discussions at recent Symposia held at Rotorua, there is a growing body of opinion, particularly among research people and economists, that harvesting thinnings at any stage in the life of a plantation is not a paying proposition. This raised a big question with regard to pulpwood availabilities and also with regard to the meaning of term thinning.

Recent research publications draw attention to the fact that the sawlog tree yields up to 50% of pulp quality material in top logs, slabs and off-cuts and that the widespread development of chipping ensures that the pulp mills' needs will be met. Indeed a new schedule for radiata pine underlines this approach. This schedule is designed to grow a quality sawlog crop on a 25 year rotation by a respacing and pruning regime calculated to produce a mean annual ring width at breast height of 25.4 mm.

The underlying idea of this tending regime is that the main effort should be directed towards the early selection and promotion growth wise and quality wise of the 200 (per ha) final crop trees and the shortening of the rotation length. Tree conversion studies indicate that 30% of the volume and 50% of the value of plantation grown sawlog type trees are represented in the lower six metres of the stem. The proposed schedules seek to maximise the value of saw log output by early espacement and pruning to 6 metres before the top height reaches 12 metres or when the crop is 8 to 10 years old.

Further high pruning of the final crop trees up to 11 metres is recommended in the case of a *trees and grass enterprise*, as much to enhance grazing prospects, as to improve quality of second and top logs. It is expected that this system which involves no thinning will yield up to 50% by volume of the harvested crop as pulp wood or chips in the form of round-wood from top logs and chips and waste from the sawmills.

The trends in radiata pine plantation forestry in New Zealand in the Spring of 1975 seemed to be towards:

- (1) Greater emphasis on quality and vigour in planting stocks.
- (2) Increased recognition of the effect of land quality and accessibility on the net returns from plantation forestry.
- (3) The reduction of the effects of competition from vegetation by use of herbicides, cultivation and fire.
- (4) The shortening of rotations by wider spacing and/or earlier spacing, to encourage maximum diameter growth on the selected final crop trees.
- (5) The encouragement of knot free timber production in the lower 10 metres.
- (6) Recognising that the major cost component in forestry in the future will be in harvesting and transport rather than in establishment and tending and that the need for and possibilities of cheaper harvesting systems should be kept under constant review.

Farmers were being urged to consider combining trees and grass on good pasture convenient to roads, near centres of high forest industrial concentration or in areas with good log export prospects.

From what I could gather the main impetus in furthering this proposition was coming from the big integrated wood products industries and not from the farming interests. It is recognised that cleared suitably located farm (pasture) land may prove to be the best prospect for maximum returns in forestry net of costs and that steep uncleared and scrub covered land is likely to yield poorer net returns.

Forest Health

A large exotic forest such as exists in Kaingoroa must surely invite problems such as windthrow and epidemics of insects and fungus pests. While windthrow does not appear to be a major factor on the pumic soils round Rotorua, it is a problem in the South Island.

There have been a number of major scares in regard to insect attack — the most noticeable being the *Sirex noctilis* which threatened disastrous losses in the 50's. This pest caused widespread deaths in the plantings of the late 20's. In the final analysis since it was mostly sub-dominant and suppressed trees that succumbed, the results were more beneficial than harmful, resulting in a form of natural thinning in overstocked plantations at a time when silvicultural intervention was not possible. This pest was eventually controlled by parasites.

Fungal attacks have been more damaging and costly. The pine needle cast *Dothistroma pini* which swept through the plantations in the 60's threatened major losses until suitable spraying regimes were worked out. These problems must be constantly researched and the control systems rigidly adhered to — just as is the case with agricultural crops.

At the time of my visit worrying outbreaks of *Phaeocryptopus* on Douglas fir and *Armillaria* on pines were giving cause for concern.

Deer of various kinds and introduced vermin such as opossum and rabbits have caused, and continue to cause serious losses in plantations and in valuable reserves of indigenous forest. This is particularly the case in the South Island.

In the more intensively managed pine plantations the vermin situation seems to be well in hand. Deer are kept under control by shooting and provide attractive recreation for the forest labour force and a much appreciated perquisite in the form of venison or tourist revenue. There is a good market for venison and deer farming is becoming a recognised and acceptable rural enterprise in certain areas.

Indigenous Forests

In little more than a century half the native forest of New Zealand has been cleared. There are still 6.2 million ha remaining. Most of this is classed as protection forest or is incorporated in National Parks and reserves and is, therefore, fairly well secured against the pressures for further clearance for agricultural purposes. There is strong opposition in many quarters to any further depletion of the indigenous forest for any purpose whatsoever. This has placed the State Forestry Service in a dilemma.

The Service has an area of 650,000 ha of merchantable indigenous forest — mainly *Nothofagus* (Southern) Beech which presents a great opportunity for sustained yield management along classical European lines. Selection felling and natural regeneration is expensive because of the intensive roading required. The timber of the Southern Beech is not readily marketable. The main opportunity for indigenous forest silviculture is on the West coast of the South Island. This whole region badly needed revitalisation and a forest products industry along the lines developed in the North Island would complement the growing tourist industry.

A special study was made of the forestry potential of the project area and a report was issued in 1973. This involved a major softwood development — the planting of scrub, cut-over open land and some indigenous Podocarp forest — running to 100,000 ha. This exotic softwood forest would eventually generate a flow of industrial wood sufficient to support a wood products complex which could absorb the production from the managed *Nothofagus* forest. It seemed a most worthwhile project from every point of view, but it ran into a storm of controversy from a 'Save the Beeches' pressure group, led by a Mr. Searle, founder of Friends of the Earth in Britain who had come specially to New Zealand to mount the campaign. In 1975 it looked as if the Southern Beech Forest Project would be shelved not because of the opposition from the Friends of the Earth, but because of the recession in Japan and Australia.

These countries currently take 86% of New Zealand's wood products exports and thus were a vital factor for the success of the west coast project. Already in 1975 signs of slow-down were evident in the existing big industrial plants. An accumulation of logs and great mountains of chips spoke eloquently of the Japanese failure to take up agreed quotas.

One thing is certain, plantation forestry in New Zealand has set a pattern for such projects all over the world. It is obvious, that the more indigenous forest is cleared or reserved the greater is the need for high yielding efficiently managed plantations.

What has happened in New Zealand's North Island will eventually, I'm certain, be reproduced not alone in the South Island, but in America, Kenya, Chile and in developing countries if one is to judge by the number of visiting foresters met there from such lands and the demands on New Zealand personnel for help in forest products industrial development.

New Zealand forestry and New Zealand foresters have a lot to offer to the world and a forestry journey to New Zealand is indeed worthwhile.

THE COMMONWEALTH STATE'S SOFTWOOD PLANTING PROGRAMME

The Australian Forestry Council sponsored an Agreement between the Commonwealth and States under which Victoria would plant 2,000 ha/an. between 1966 and 1971. The State was required to finance the first 2,200 ha planted each year and the Commonwealth the balance, with the latter's contribution of loan funds being interest free to the State for the first ten years. A second five year agreement, signed for the period to 1976, on similar terms to the first agreement. A Softwood planting programme of 6,000 ha/an. is calculated to make Victoria self-sufficient in softwood by the year 2,000 A.D.

This 'conventional' schedule, which is not rigidly adhered to generally in New Zealand or even in the Kaingoroa region, is designed to:

- (1) Produce a final crop of sawlog trees of 250 to 300 stems per ha on a rotation of 35 years.
- (2) To provide for a prime pruned, knot free butt log of 6 metres.
- (3) To allow for one commercial thinning at 15 years when the mean ht. of the crop is 22 metres. (All trees felled in previous thinnings except in exceptional favourable situations, e.g. where there is a demand from fencing concerns are allowed to lie and rot as the material is not considered worth extracting).

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