V. SUMMARY

A brief account is given of the causes of insect epidemics and the course which they may be expected to follow. Insects causing epidemics are classified as primary or secondary and indigenous or exotic, and trees are classed as either indigenous or exotic. Examples are given of outbreaks in New Zealand and the significance of the absence of outbreaks in certain groups in the classification adopted, is discussed.

FARM WOODLOTS IN THE WAIRARAPA

By D. M. BLITHE

(Paper tabled at Annual Meeting)

In 1951 I was one of three departmental officers who shared the organising and judging of a Best Tree Planted Farm competition, sponsored by the district branch of Federated Farmers. During the course of the competition, the first of its kind in the Dominion, most of the farms in the district were visited and the judges' notice was constantly directed to the value a planned woodlot contributed to a farm's economy. My aim in presenting this paper is to bring forth for discussion the need of the planned woodlot in the national economy and also, the assistance we, as technical and practical foresters, can contribute. With our indigenous timber resources rapidly dwindling, conservation becomes more necessary and the fostering of the planned woodlot, in my opinion, essential.

The original indigenous private holdings in the Wairarapa have been over exploited for many years and as all the local State Forests are now regarded as protection forest, a large percentage of the timber requirements have to be imported from the central North Island. At the present time there are approximately 10 small milling plants cutting 50% each of exotic and indigenous timber. The exotic timber, predominately *Pinus radiata*, is being drawn from farm shelter belts and the present royalty rate ranges from 10/6d. to 14/6d per hundred board feet. The foresight of the early settlers can be seen in the excellent shelter belts still on some initial farm properties, but much of this has been milled and this source of supply was of great value during the war years. It is most regrettable that so little has been done by the farming community to replace this asset. Many of the plantings in the Wairarapa date from the 1920's when the Forest Service made available free or low-priced tree stocks.

Today, the local nurserymen cannot meet the demand for tree stock and much is imported from Nelson and New Plymouth districts.

One fault found in both past and present plantings of woodlots has been the establishment of such large areas that any sustained silvicultural treatment has been impossible. This type of planting has prejudiced some farmers against establishing a woodlot. Fortunately the attempts at aerial sowing over large uneconomic areas on a few big holdings have been unsuccessful. I doubt whether there was any thought given to the silvicultural treatment or management before sowing. If germination of the aerial sown seed had been successful the landowner would soon have been in the position of having to decide between sheepfarming and forestry as his occupation.

The influence of one or two men in each county in the Wairarapa is reflected in the species planted in their county and this is particularly evident with Eucalypts in the Castlepoint area. A wide variety of this species have been planted by early settlers but with no apparent thought on planning suitable sites and variety of species : the results have prejudiced others against planting Eucalypts. On suitable sites successful plantings have been made of *E. viminalis*, *E. regnans*, *E. macarthuri* and *E. obliqua*. Because of poor quality timber and the difficulties of satisfactorily sawing the Eucalypts have lost favour with farmers as a major tree crop and will probably only be grown in small lots for special purposes on future farm forestry projects.

To support the further establishment of farm woodlots in the Wairarapa district, this yield data collected by the Forest Research Institute from mature and over-mature *Pinus radiata* woodlot type stands in the district is presented :—(The Rotorua 1949 Table used for yield).

A stand planted 40 years ago—spacing 8 x 8, with 230 crop trees to the acre. Mean crop DBH 17.8″, mean crop height 104 feet and crop basal area 377 square feet. Yield to a 9 inch top=10,600 cubic feet. Site quality was 111.

2nd stand aged 62 years. 8 x 8 spacing with 125 crop trees to the acre. DBH 27.8″, height 130 feet and crop basal area 525 square feet. Yield to a 9 inch top=15,280 cubic feet. Site quality was 11.

3rd stand of 48 years, 6 x 6 spacing and 235 trees to the acre. DBH was 17.9″, height 120 feet and crop basal area 412 square feet. Yield to a 9 inch top=13,300 cubic feet. Site quality 111.

4th stand, 58 years old, 9 x 9 spacing and 103 crop trees to the acre. DBH was 31.6″, height 135 feet and crop basal area 557 square feet. Yield to a 6 inch top=21,730 cubic feet. Site quality 11.

This last stand recorded the highest yield known to the Forest Research Institute for exotic species in New Zealand. All these stands were unthinned but some windthrown trees had been utilized.

Other comparative figures of growth rate for various species grown in this district are :—

A 78 year old tree of *Pinus radiata* had a DBH of 65 inches and a height of 108 feet. The average annual diameter increment being 0.83-inches and height increment equalling 1.38 feet.

Another *Pinus radiata* tree aged 30 years had a DBH of 32 inches and a height of 110 feet. Annual height increment averaging 3.66 feet.

A *Sequoia sempervirens* tree of 25 years had a DBH of 25 inches—annual increment 1 inch. Height was 80 feet—annual height increment of 3.20 feet.

A 25 year old tree of *E. obliqua* had a DBH of 19 inches—annual increment equalled 0.76 inches, and a height of 100 feet—annual height increment of 4 feet.

In addition to the above, a ¼-acre stand of 6 x 6 *Pinus radiata* was recently felled on a farm in this district. This 40-year old stand yielded a return equalling £520 per acre, thus averaging £13 per acre for each year—the royalty rate paid was 8/8d per 100 board feet. Revenue from grazing sheep and cattle on the adjoining farm land was only £5 per acre in 1951. There had been no silvicultural treatment carried out in this shelter belt during the whole 40 years.

Another 4 acre stand of *Pinus radiata* aged 12 years with 8 x 8 spacing and approximately 500 trees to the acre was recently low pruned and thinned to 300 trees per acre. The total cost for this operation was £50. Firewood was utilized from the thinnings and 20 cords were sold on the site for £30.

The most successful species for woodlot planting in the Wairarapa have been *P. radiata*, *C. macrocarpa* and Douglas fir, also *Sequoia sempervirens* on selected sheltered sites. I consider that *C. macrocarpa* grown under farm woodlot conditions in this district and possibly right through the Wellington Province is the best species to meet general all-round, farm requirements. From my own observations I hold the opinion that on a rotation of 50 years this species will produce reasonable board timber. In planning any such scheme for this district I would recommend that the following species and proportions would prove suitable :—

Pinus radiata—30% ; *C. macrocarpa*—30% ; Douglas fir—20% ; Eucalypts—10% ; and Redwoods—10%.

It is possible that the source of supply of hardwood requirements will be from plantings by the individual and Catchment Boards to arrest slumping country and gully control.

In the Wairarapa no *Larix decidua* of good form have been seen but it has been noted that they were all planted on poor sites. There are younger stands of this species on warm easterly aspects that are

very promising. However, any planting of this species in the overall plan of a farm woodlot would definitely clash with Douglas fir sites. But a mixture of alternative rows of *Larix decidua* and Douglas fir seems worth a trial.

An outstanding farm forestry project in the Wairarapa is situated at Whareama on the Eastern coastal belt where the original forest was *Nothofagus solandri*. This farm of 1,073 acres was settled 30 years ago and it was then a treeless locality with a ground cover of short stunted manuka, Danthonia and Brown Top. The occupier realised the need for handy available timber and implemented a planned woodlot planting scheme spread over 10 years. Plantings was commenced in 1923. These ten year plantings have stopped small stream erosion and gully erosion, provided shelter required for the homestead and sheep yards and fully achieved the ultimate aim of first class farm timber. The main species planted were *P. radiata*, *C. macrocarpa*, Douglas fir and a very wide selection of Eucalypts. *E. viminalis* is the most vigorous and the best developed of the Eucalypts planted. At the present time they are clean boled and have been limbed up to 50 feet, this stand is 30 years old and has an estimated 200 trees per acre, the original spacing was 6 x 6. 30 year *C. macrocarpa* are clean pole type trees, limbed up to 50 feet with an average diameter of 13 inches—maximum diameter of 18 inches. This stand has 200 trees to the acre with an average height of 80 feet. Another *C. macrocarpa* stand planted 20 years ago with 6 x 6 spacing and limbed up to 50 feet had an average diameter of 8 inches and height of 75 feet. The present estimated stand per acre was 220 trees. *P. radiata* planted 30 years ago in 6 x 6 spacing have been limbed to 50 feet and are in the 100 feet height class ; with a maximum diameter of 29 inches and an average DBH of 19 inches. The present estimated stand is 209 trees per acre.

Full utilization of thinnings has been achieved and only the suppressed and co-dominant trees have been removed as required for use. All thinnings have been seasoned under the canopy of the thinned stands. Posts, rails, strainers, stays and feet for posts are all treated in a small creosote dip—cold treatment. Excellent results have been obtained with *P. radiata*, *C. macrocarpa* and Lombardy poplar. The Lombardy poplar battens having practically full absorption of creosote.

This woodlot project has been limited to 10 acres yet this farm is more than self-sufficient for all classes of timber from sawn board to firewood. All work on this woodlot has been regarded as a spare time job for the owner and the two men usually employed on this sheep station.

In addition to farmers' efforts, the Wairarapa Catchment Board are establishing experimental farm units to test and prove the wisest economic use of varying types of land ; the establishment of woodlots

has been included in these schemes. A noticeable awareness of planned shelter and woodlot requirements on farms is shown by many of the younger men settled under the Rehabilitation scheme.

Most of the holdings in this district have some uneconomic land suitable for the establishment of woodlots; and although the area would naturally vary with each farm, I consider that an area of 6 acres in woodlots for a holding of 1,000 acres and 10 acres for larger holdings to be suitable. Wherever possible woodlots should be sited within a reasonable distance of the homestead or shearing shed to allow full use of farm labour during slack periods in the silvicultural treatment of the woodlot.

At this juncture I wish to pay tribute to the Department of Agriculture for the publications issued and the technical advice supplied to the farming community to encourage farm shelter and beautification of homesteads. I suggest that this avenue of information should be broadened to include technical and practical instruction for the development of woodlots.

Another sound reason for the encouragement of such a scheme is the definite lessening of the fire hazard as the risk would be spread over small areas scattered throughout thousands of acres instead of being concentrated in one large plantation.

Timber produced by the farming community will be in direct competition with both State and private forest projects where efficient methods of management will be operating so the aim of producing timber of a very high grade will have to be set. Therefore, in the practical planning of any such scheme continuity of planting, protective fencing from stock, silvicultural treatment and selection of species suitable to sites will all have to be studied. For instance, although 6 x 6 planting is used in large managed forests I consider that a 9 x 9 spacing would be the more practical for a woodlot.

The hoped-for future supply from these woodlots and from area planted by the Forest Service in the Wairarapa will do much to remedy the results of the devastation of our natural timber resources in the past. This scheme should not create any surplus of timber in the southern North Island, there is a ready market throughout the whole district and also, the Wellington market is not far distant and with the completion of the Rimutaka Tunnel the transport problem will be eased. Farm timber would be in ready supply and at a reasonable cost compared to the present day market price. From information furnished by the farming community the popularity of concrete posts is on the wane as weather penetrates the porous concrete to the re-enforcing and one bump from heavy stock—particularly on hill country—means replacement of the post. Creosoted Larch and Douglas fir and other indigenous posts are in keen demand but very few posts reach the Wairarapa district because the sources of supply is so far distant.

P. radiata can be logged, transported 20 miles, sawn and delivered back to the farmer at 32/- a 100 board feet. If there was this ready supply, not only would local rural and urban mills be given a new lease of life but also portable mills would probably be started to serve the farmer living too far from established mills for the transport and sawing of his timber to be an economical operation.

With the line of demarcation between farming and forestry interests so close as to be almost intermeshed, all foresters need to maintain a realistic policy of close association with the farmer in the most economical use of land to produce agricultural and silvicultural products. Over the period of development and settlement of New Zealand close liaison has been continued between all Government Departments concerned and the farming community in the encouragement of tree planting. We, as technical and practical foresters can contribute to the prosperity of the community as a whole by further research into the prospects of the farm woodlot as a source of timber for the future.

Further research is also needed into preservative treatment of produce from woodlots against insect attack, rot and fungi. At present the cold tank creosote preservation is practised but this method is costly and if a more practical and less expensive ingredient could be found it would encourage this most necessary part of farm forestry.

We have reached a stage in New Zealand where our colleges and schools should have a demonstrational forest acre attached to foster individual farm forestry among the younger generation. It could be run on similar lines to the farming activities undertaken at many colleges. A full tree planting and silvicultural operation, with complete check on monetary returns over a period of years would be attained and students leaving school would have an excellent background to carry out farm forestry projects on their own holdings.

With the present emphasis on maximum food and farm production, all land that can be worked by ploughing and cultivating with mechanical means is regarded as farmable. So the suitable land available for large scale forest projects must become even more limited in area and restricted in forestry potential. The farming community is today showing a keen interest in the production of timber for local uses and they realise that they can profitably assist in building up the regional timber resources. The Lands and Survey Department have in recent times had numerous enquiries from prospective small scale foresters wanting areas of approximately 200 acres suitable for afforestation.

The time seems opportune for a vigorous policy for the furtnerance and the encouragement of the planned woodlot. Otherwise farm woodlots and small afforestation projects throughout our rural areas will continue haphazard, unplanned and with risk of considerable financial loss to the individual and still greater loss to the community in prospective timber resources.

THE LOGGED PODOCARP STANDS OF THE LONGWOOD RANGE, SOUTHLAND

By J. T. HOLLOWAY

I. INTRODUCTION

A problem which has exercised the minds of many New Zealand foresters over the past several decades has been that of the restoration to productivity of the logged podocarp forests. The derelict condition of these forests, particularly of those of the southern hill country, is generally well known, but, rather surprisingly, a clear factual account of the present condition of the stands nowhere appears in print. A very considerable body of information has accumulated in forest records and a wealth of detailed descriptive material is pigeon-holed in the archives of the National Forest Survey; but, unless this information be periodically dragged forth into the light of day, the problem as a whole is unlikely to receive the attention it deserves.

It may very well be, of course, that no substantial action to resolve the problem will prove possible under present economic circumstances but, as population grows and pressure on the land increases, the problem will loom ever larger. There can be no doubt but that, at some date perhaps not far distant, the logged podocarp lands must be taken in hand with a determined attempt made to restore them to a condition such that they can once more play an important part in the over-all land-use economy of the country. They cannot be allowed to support, indefinitely, a worthless growth of scrub hardwoods.

Admittedly, one school of thought holds to the view that, in course of time, the podocarps will re-establish and that a continued measure of fire protection, coupled with unlimited patience, is the only measure required to be undertaken. But what, in fact, is the true position ? How much podocarp advance growth or regeneration is on the ground after thirty, forty or even seventy years ? What is the present condition of the logged podocarp stands ?

The answers to these questions are largely contained within existing records. For this present paper which deals specifically with the logged podocarp stands of the Longwood Range, the answers given below have been abstracted from the sample plot records of the Forest Survey, the field work having been carried out during the years 1946-47.

II. GENERAL DESCRIPTION

Briefly, the logged podocarp stands of the Longwood Range extend across some 30,000 acres on the foothills and lower slopes of the range which itself lies some 30 miles to the west of the city of