IN NEW ZEALAND CONTEMPORARIES

TRANSACTIONS AND PROCEEDINGS OF THE ROYAL SOCIETY OF NEW ZEALAND

SOME POST-GLACIAL CLIMATIC CHANGES IN CANTERBURY AND THEIR EFFECT ON SOIL FORMATION. J. D. Raeside, Vol. 77, Part 1, April, 1948.

Author's Summary : Anomalies between vegetation and soil on the one hand, and present day climates on the other, are discussed in their application to the problem of climatic changes. The climates now prevailing over regions where pedalfers (soils from which the alkalis and alkaline earths have been leached) exist, do not resemble climates associated with similar soils abroad : they resemble rather climates associated with pedocalcic soils (soils with accumulation of lime). It is suggested that this may be explained by the hypothesis that the soils in question have suffered several climatic fluctuations and spent part of their life under a wetter climate.

The nature of the latest climatic changes is discussed and the hypothesis is advanced that forests flourished on the downlands of Canterbury and on parts of Otago now devoid of forest, between the seventh and thirteenth centuries. At this period, it is suggested, the temperature was at least 2°C. higher than it is at present.

The soils of Canterbury and Otago would therefore appear to be related to a complex climatic factor. The theory is therefore advanced that soil profiles in these regions should be regarded as complex and not in equilibrium with present climates.

NEW ZEALAND JOURNAL OF SCIENCE AND TECHNOLOGY.

NOTHOFAGUS POLLEN FROM THE CRETACEOUS COAL MEASURES AT KAITANGATA, OTAGO, NEW ZEALAND. M. T. Te Punga, Vol. 29B, No. 1, July, 1947.

Author's Summary : Nothofagus pollen from the New Zealand Cretaceous at Kaitangata is described as a new species, *Nothofagus kaitangata.* The dominance of a six pore number shows closer affinity to living South American species than to present New Zealand species. This is apparently the first record of *Nothofagus* in beds known to be older than Tertiary in New Zealand.

AN EXPERIMENTAL PRESSURE PLANT FOR TIMBER PRESERVATION RESEARCH. K. M. Harrow, Vol. 29B, No. 3, November, 1947.

In connection with investigations into methods of timber impregnation it was found necessary to install a pressure plant at the Plant Diseases Division of the Department of Scientific and Industrial Research, Auckland. Requirements were the treatment of commercial size building timbers of sufficient length to obviate the effect of end penetration, operation over a wide range of initial and final pressures and temperatures, and a means of reading absorption rapidly and accurately. A description is given of such a unit designed and installed at the Division.

METHODS OF EVALUATING PRESSURE SYSTEMS FOR TIMBER PRESERVATIONS WITH AQUEOUS SOLUTIONS ABSORPTION. K. M. Harrow, Vol. 29B, No. 3, November, 1947.

Author's Summary : New Zealand building timbers require preservative treatment to protect them from wood destroying beetles. The treatment method used should ensure that cutting treated timber does not expose untreated susceptible wood, a requirement which can be achieved by using suitable pressure impregnating systems. Methods developed to compare gross absorption, kickback and nett retention produced by various pressure systems are presented.

A NOTE ON THE OCCURRENCE OF COPTOTERMES NYMPHS IN HARDWOODS FROM AUSTRALIA. K. M. Harrow, Vol. 29B, No. 4, January, 148.

Nymphal forms of *Coptotermes acinaciformis* have been found in imported hardwoods. This stage had not previously been observed among *Coptotermes* in imported material. The ability of such nymphs to establish and multiply constitutes a definite menace.

NEW ZEALAND NATIONAL REVIEW.

NEW ZEALAND'S EXPORT TIMBER TRADE. W. C. Ward, Vol. 31, No. 4, April, 1948.

New Zealand's export timber trade reached a peak of 95 million ft. b.m. in 1912 and had declined to 13 million ft. b.m. by 1939. With the anticipated decrease in the cut of rimu an insignificant amount of it will be available for export. A surplus of about one million ft. b.m. per annum of sap matai will probably continue to be exported to Australia, but kahikatea will dwindle to neglible proportions, and there is no future prospect of kauri export. Of hardwoods not more than a million ft. b.m. of silver beech is likely to be available annually, but probably 2 to 4 million ft. b.m. of tawa could be exported if the market would absorb it.

Past and future expansion of the cut of *Pinus radiata* is discussed; it is stated that successful conversion of New Zealand's exotic forests, predominantly of this species, depends on the establishment of a relatively large export trade. While problems of equipment, labour and shipping make prediction difficult, it is conservatively estimated that an export market increasing from 10 million ft. b.m. in 1948 to 45 million in 1952 is well within the industry's ability. By 1965 the exportable surplus will probably exceed 200 million ft. b.m. annually.

Shipping is likely to remain the limiting factor in the export trade. Shortage of ships is aggravated by the concentration of the exportable surplus in the northern half of the North Island where port facilities are rather inadequate. At present the price for New Zealand exotic softwoods on the Australian market compares favourable with that for comparable specifications from the Northern Hemisphere, but a price reduction must be expected with a broadening of the trade.

In view of the necessity for correct treatment and grading if this market is to be expanded, and for a fair sharing of available shipping space, careful control of export seems essential.

VOLUNTARY CONTROL OF NEW ZEALAND TIMBER INDUSTRY AS OPPOSED TO STATE DIRECTIVES. A. Carter, Vol. 31, No. 5, May, 1948.

The need for controls in the industry is admitted. They have become increasingly necessary in the present period of declining indigenous supplies, both cut and use of which must be regulated in the public interest; but no less so in the rapidly expanding field of exotic forest utilization, success of which is dependent on the development of an adequate export market.

The writer contends that such controls can be applied most efficiently and with least friction by the industry itself, within the lines of general policy laid down by the Government. The assumption of these functions by the Sawmillers' Federation and regional commercial organizations would be more an extension of their present functions than a new departure.

THE ESTABLISHMENT, SILVICULTURE AND MILLING OF PINUS RADIATA IN THE NELSON DISTRICT, NEW ZEALAND. L. E. H. Baigent, Vol. 31, No. 6, June, 1948.

This paper describes 25 years experience in the cultivation of *Pinus radiata* on the Moutere gravel soils of Nelson. The writer, a sawmiller as well as a forest owner, has endeavoured to overcome what he claims to be both silvicultural and financial difficulties to the private owner in conventional European practices.

It is stated that seed collection from a light-limbed type of *P. radiata* enabled spacing to be increased from 6 x 6 feet (1210 trees per acre) to 9 x 9 feet (538),

without significant increase in the size of branches. With such a spacing the dominant members of the stand reach a diameter of 13 to 15 inches at 14 years. By removing these in a first thinning along with any suppressed or cull trees, a return from sawlogs sufficient to repay establishment costs can be obtained. The residual co-dominant trees liberated at this early age are capable of growing into a satisfactory stand, which is thinned again at about 19 years by removal of its intermediate members, then of milling size. A rotation of 35 years is proposed. Costs, yields and financial returns from a 1,000 acre plantation up to first thinning at 14 years is given.

THE ROLE OF THE FORESTER IN NEW ZEALAND. Owen Jones, Vol. 31, No. 7, July, 1948.

"The fundamental idea of forestry is the perpetuation of forests by use. Like all life the forest is preserved not by non-use, but by regeneration, a succession of generations . . . ." Following the pattern of the development of forestry in new countries in the English-speaking world, New Zealand had hastened at first to clear more than half the forest land. Much of this clearing was justifiable for settlement, but mistakes and excesses occurred; timber resources at first seemed inexhaustible. But the period of apathy towards forest resources is apt to be succeeded by a swing to the opposite extreme, induced by sentiment rather than reason, in the belief that to conserve a forest is to shut it up and prohibit any utilization. Although at times the forester must advocate measures in conflict with the individual aim of the timber operator, ultimately there must be confident co-operation between them, as both are concerned with perpetuating timber supplies. Though he may not always participate directly in felling and extraction, the forester must always have control of the axe if permanent injury to the forest is to be avoided.

Utilization is the oldest phase of forestry with protection, silviculture, management and law evolving with development of a forest policy. In New Zealand at present such steps as are being taken to assess the timber resources, provide training facilities for foresters, improve protection of the forests and promote soil and water conservation show a realization that resources should not be wasted but provision made for the future. Some important issues, such as the relationship between the State and private forest owners, have not yet been resolved.

The two questions of most immediate concern to the forester in New Zealand are the regeneration of the main timber producing indigenous species and the handling of the extensive exotic plantations. The establishment of the bulk of these latter was concentrated in a period of about 10 years.

As a result they will tend to fall due for utilization in vast quantities in a brief space of time. So far but a small part is embraced by management schemes, so that these man-made forests are liable to be thought of as inexhaustible and having as little need of skilled attention as were the virgin indigenous forests. The problem which these forests present to the forester is scarcely less than that of their utilization, if sustained yield, better choice of species and better silvicultural practices are to be achieved.

PLANNED REGENERATION OF NEW ZEALAND INDIGENOUS FORESTS. C. M. Smith, Vol. 31, No. 8, August, 1948.

In the past New Zealand has shown an almost traditional preference for exotic as opposed to indigenous trees. This has been due largely to settlement beginning on the natural grasslands where indigenous species could not be grown successfully, but where some exotics throve. Extension of grassland at the expense of natural forest has probably now reached its limit, and in some cases forests will have to be brought back over that frontier. In these exacting frontier conditions and in the residual forest areas there is evidence that indigenous species will prove more suitable than the exotic. The author analyses the factors, both biological and economic, which determine the suitability of the common indigenous timber species for domestication and deliberate perpetuation.

First he discusses and classifies nine major species—kauri, totara, matai, rimu, kahikatea, silver beech, red beech, hard beech and black beech, and seven minor species—tanekaha, tawa, miro, silver pines, kaikawaka, rewarewa and mountain beech—under the headings of ability to sprout, method of flowering, frequency of seed years, fruit type and habit, possibility of seed collection and storage, germination of seed, growth habit at different periods of life, and social habit. In a second table a contrasting grading of these species is given on the bases of timber marketability and regenerative capacity.

It is evident that generally the regenerative capacity of the indigenous timber species is not high, but in some such as silver and red beech and kauri it is reasonably good; moreover they occur in the main on land too poor for agriculture. Others, such as silver pine, kaikawaka and mountain beech, grow on land so poor that it would not support any other timber species successfully. Others again such as kahikatea, and generally matai and black beech, though having a satisfactory regenerative capacity, will have no place silviculturally because their habitats are required for agriculture.

Among the minor species rewarewa and tawa can be regenerated quite well and are now becoming more generally marketable.

Rimu, though the most widely distributed major timber species, remains the silviculturalist's greatest problem. In spite of its ubiquity regeneration factors are otherwise adverse. However, in three places—Stewart Island, large tracts of the West Coast of the South Island and where it occurs in association with red and silver beech—regeneration is good on land not required for agriculture.

SOME ASPECTS OF WOOD PRESERVATION IN NEW ZEALAND. F. P. Worley, Vol. 31, No. 11, November, 1948.

The extent of damage caused by boring insects, and to a less extent by fungi, is stressed and a plea made for pre-treatment of building timber.

Our present timber economy necessitates greater use of non-heart grades and species highly susceptible to insect attack. Since fungus attack of most timber is serious only in certain situations where dampness is unavoidable, it is claimed to be uneconomic to treat all members to the same standard. The author favours water-soluble preservatives on grounds of relative cheapness. Boric acid is claimed to be an effective deterrent to insect attack, while more costly salts are necessary only in situations favourable to wood-rotting fungi.

A plea is made for the latest results in timber preservation research to be made generally available by their incorporation in specifications issued by the N.Z. Standards Institute.

NEW ZEALAND JOURNAL OF AGRICULTURE.

COMBATTING SAND INVASION OF FARMLANDS. H. de O. Chamberlain Vol. 76, No. 2, February, 1948.

Problems in the stabilization, protection and effective grassing of coastal sand country are described. Before the flats and stable sandhills can be safely developed, the unstable dunes must be fixed. The function and construction of the foredune is discussed; also the characteristics and uses of the commoner sand binders and sand collectors.

Tree lupin is introduced on the freshly stabilized areas behind the foredune to increase humus in the sand, and to facilitate consolidation and moisture retention necessary before grassing can be undertaken. Suitable grasses and clovers are listed and methods of establishment given.

Wandering dunes, higher stabilized dunes and dry ridges remain a menace to the developed sand flats unless given a permanent tree cover. Such areas must first be planted in marram, lupin or other cover according to their nature before pines can be successfully established.

GROWING TREE STOCKS FOR SHELTER PLANTING. M. Sutherland. Vol. 76, Nos. 2 and 3, February and March, 1948.

This article, together with several abstracted in earlier numbers of the New Zealand Journal of Forestry and those below by the same author, forms a series on various aspects of farm tree planting.

In the first section requirements are given for a good nursery for raising hedge plants, native trees and shrubs, and trees for tall shelter. Seed should not be collected indiscriminately but only from trees exhibiting desirable characteristics. Time of collection of seed from various trees and shrubs, and methods of extraction and storage are given.

The second section deals with the care and treatment of seedlings : the purpose and methods of wrenching and lining out are given, and the optimum size of planting stock of various species for different types of country described. Some consideration is given to the vegetative propagation of conifers (mainly cypresses) as well as hardwoods.

MULTI-PURPOSE TREES FOR PLANTING ON FARMS. M. Sutherland. Vol. 77, No. 1, July, 1948.

The author discusses the uses, other than for timber, to which willows and poplars can be put on farms.

Salix babylonica is perhaps the most widely used willow for shade. Unlike most other members of the genus, the foliage is quite palatable to stock and, owing to its great recuperative powers, can be lopped heavily in times of drought without permanent damage. The use of willows for shelter and for soil and stream-bank control are discussed. For the first purpose *S. caprea* is given particular mention.

The harmful effect of willows when out of control, particularly in stream channels is stressed. *S. caprea* has been declared a noxious weed by several local authorities. Eradication of unwanted willows is explained, a combination of ring-barking and arsenic poisoning being recommended.

Among the poplars the Lombardy is outstanding for shelter, either alone or in combination with a hedge plant ; it is also the most widely used for erosion control. Other species are listed for these purposes, as well as for shade and amenity planting. A warning is given of the difficulty of controlling the spread of silver poplar where grazing is impossible.

BURNING OF MONTANE TUSSOCK GRASSLAND. T. G. Sewell, Vol. 77, No. 3, September, 1948.

Montane tussock grassland occurs on 6 million acres between 1,000 and 3,000 feet on the east side of the Southern Alps.

The author records observations made on part of a burn on a shady face receiving some summer sunshine and swept by north-west winds. The area studied is in the neighbourhood of Cass and Craigieburn in the Waimakariri River basin. Average annual rainfall was estimated at between 36 and 50 inches. Because of the very variable nature of the country and wide climatic differences, particularly in rainfall, the author stresses that conclusions drawn from this area cannot be applied broadly to the whole extent of montane tussock grassland.

To-day burning is generally restricted to early spring : the area studied was burnt in September, 1946, as part of normal land management.

After discussion of topography, climate, soils and vegetation of the locality, the method of observation is described. Behaviour of the three major species, fescue tussock (*Festuca novae-zelandiae*), blue tussock (*Poa colensoi*) and silver tussock (*Poa caespitosa*), is discussed and the following conclusions deduced :

1. Burning partly kills the tussocks.
2. It is more severe on fescue tussock in dry areas than in damp localities.

3. It is less severe on silver tussock, which usually grows in damp localities.
4. It is least severe on blue tussock.
5. Burning removes the protection of the old leaves and permits stock to graze on the new leaves.
6. It removes from the base of tussocks the dead material which forms humus and protection for the germinating seeds.
7. It reduces the growth of leaves.
8. It reduces the production of seed.
9. It is suggested that it may be two or more years before the micro-climate redevelops suitably for the germination of seed.

TREES AND HEDGES FOR THE APPROACH TO THE FARM. M. Sutherland, Vol. 77, Nos. 5 and 6, November and December, 1948.

Types of approach to homestead and farm buildings are discussed, and a list given of species suitable for widely spaced planting of a spacious unfenced approach, for avenues, and for hedge-lined driveways. Though present conditions generally limit the area and labour which can be devoted to amenity planting, emphasis is laid on the necessity for adequate spacing. Merits of evergreen and deciduous trees used either singly or in combination are discussed.

Careful preparation of a scale plan of proposed planting is very desirable if available land is to be used to best advantage for amenity and shelter, and if difficulties caused by shading of the roadway or interference with existing or possible future power lines are to be avoided. Fast growing temporary shelter is sometimes helpful as a nurse for more exacting permanent trees.