

it is urged that in sales of forest produce the wood should be measured in as raw a state as possible. The demand for skill in all forms of logging work and its general remoteness from populous centres, with the consequent necessity for adequate wages and reasonable amenities in order to attract the right type, are pointed out; may it not be overlooked that the same applies also to the forester.

The booklet is well printed on good paper; the figures and illustrations are for the most part well chosen and helpful, though in some cases they could be clearer.

O.J.

Soil Erosion in New Zealand.—By K. B. Cumberland, M.A., pp. 227. Soil Conservation and Rivers Control Council, Wellington, 1944. 20/-.

The author of this book has been Lecturer in Geography at Canterbury University College since 1938. He describes it as a broad geographic approach to the soil erosion problem in New Zealand: a reconnaissance not intended to deal with scientific details and exact quantitative measurements.

Though the youngest British Dominion, New Zealand has a greater erosion problem than the older members of the Commonwealth. Small in area, she yet presents strongly differentiated regional contrasts, both natural and cultural. Throughout the author develops the thesis that *“soil erosion (in association with the other physical crises in land use in New Zealand) is a distinct and separate problem for different areas; that it finds differential expression in terms of the severity with which it occurs and the forms it assumes in the landscape of different regions; that each region recognised on these bases requires different solutions of its individual soil erosion problems, and finally, that soil conservation must be approached regionally and in full knowledge of the intricate interrelation of physical and cultural conditions under which soil wastage has been hastened in differentiated regions.”*

To be seen in proper perspective, soil erosion should be regarded as one of the many aspects of land use problems; as an economic mal-adjustment as much as a pathologic physical condition; requiring integration and co-ordination of land use and soil conservation measures in the planning of a land policy.

The first hundred pages are given to the study of eight main soil erosion regions:

- North Island I: The Auckland and Coromandel Peninsulas.
- II: The North Island Mountain Axis.
- IIIA: The Taranaki—Wanganui Tertiary Hinterland
- IIIB: Wellington—Hawke’s Bay Tertiary “Hill Country.”
- South Island: IV: The South Island Tussock “Hill Country.”
- V: The Central Otago and Mackenzie Inland Basins.
- VI: South Island Foothills and “Downland.”
- VII: The Canterbury Plains.

The extent and character of erosion, the impact of climatic factors and the cultural modification of vegetation are described.

There follows a chapter drawing conclusions from this regional survey. More than two-fifths of the land area and more than two-thirds of the area in occupation is suffering from culturally accelerated erosion to a degree which justifies national concern. The present patterns of land use are substantially those designed in the pioneering days and considerable change must be made if production is to be maintained and settlement made permanent.

A programme of soil conservation must be designed on regional lines, having regard to the distinctive soil morphology, needs and capabilities of the region. Conservation practices evolved in other countries under other conditions have but limited application in New Zealand. Measures applicable in different regions are suggested in broad outline, but the necessity for more detailed investigation as the basis for preventive techniques against the manifold forms of erosion is emphasised. To be effective a co-ordinated approach is essential, particularly in the direction of stocktaking and mapping of soil erosion and the present and potential land uses. A soil conservation policy for the country must be framed with due regard to the national economy and the continuing importance of primary production.

A substantial part of the book is taken up with five appendices which describe the effect of land form, climate, soil characteristics and cultural modifications on soil erosion and summarize the Soil Conservation and Rivers Control Act, 1941. There is a glossary of technical terms used and a most comprehensive bibliography, mainly of New Zealand literature but containing a section of selected general works. The text is well supported with photographic plates, diagrams, tables and maps.

Foresters will be disappointed at the rather vague and sweeping statements on forestry matters. While such a general survey cannot hope to give a comprehensive treatment of either the bionomics or economics of forestry in relation to soil erosion, a fuller explanation of what the author has in mind would have been welcome. There is an unfortunate tendency among the increasing number interested in soil conservation to advocate "afforestation" (without further definition) as an acceptable treatment for vast areas of impoverished and eroding hinterland. The author has stressed the need for using land in accordance with its needs and capabilities and with due regard to national economy, and it is a pity that the nature of the "afforestation" measures he suggests is not more fully explained. To the layman, forest is too apt to mean high forest of commercial quality; whereas much of the suggested afforestation must, for ecological and economic reasons, be non-commercial protective cover, be it indigenous or exotic, naturally or artificially established.

The author has scant appreciation of the ecology of either indigenous or exotic forest species. "Afforestation" of severely

denuded slopes in Region IV (South Island tussock hill country) is advocated without qualification as to the nature of the tree or shrub cover that can be established and maintained on the degraded parts of a region in the main incapable of supporting forest even in its virgin state before vegetative retrogression leading to severe soil erosion had taken place.

The suggested sowing of indigenous tree seed by aeroplane is not likely to commend itself to any with a knowledge of the seeding habits and ecology of our rain forest species.

The salient weaknesses of New Zealand's exotic forest policy in the past—the tendency to concentration on remote, pastorally sub-marginal land and the maldistribution of age classes—are stressed. Perhaps over stressed, as the impression is given that there continues to be an overwhelming preponderance of *Pinus radiata* planted where it is unsuited both edaphically and climatically.

One wishes that the distinction had been made between tree growing for timber production, erosion control and farm shelter. The facile assumption, all too commonly held, that the three objectives can always be combined, is dangerous. Sometimes one or more ends can be served, but the primary objective must not be prejudiced by undue regard to the possible secondary uses.

“Soil Erosion in New Zealand” provides an excellent general reconnaissance of the country's erosion problem; a subject of increasing importance to its foresters.

G.H.H.

Problems in Tree Nutrition. (Pubd. Faber & Faber Ltd., London, 1944). pp. 184—27 plates—12/6. By M. C. Rayner & W. Neilson-Jones.

This volume presents in chronological sequence the methods and the results of some fifteen years of continuous research work on tree mycorrhizas. The immediate objective of the research was the successful afforestation of one particularly refractory area of waste land in Dorset, the Wareham Heaths, of which, as the authors point out in the introduction, records of barrenness and sterility go back at least to Domesday, if not indeed to Caesar's time, but which is now termed Wareham Forest. It is not quite clear whether the area is now a forest in fact or merely in law; but there is no doubt at all that, as the result of the research described in the book, there is much greater hope for the establishment of a forest cover on the heaths than there was twenty years ago. The wider result of the research is a much clearer knowledge of the fungal processes involved in forest growth than was the case twenty years ago; and a much clearer appreciation of the enormous gaps that still occur in our knowledge of tree root functions and of tree root symbioses and symbionts.