

REVIEWS

FORESTS AND CLIMATES IN THE SOUTH ISLAND OF NEW ZEALAND—by John T. Holloway in Trans. Roy. Soc. N.Z. Vol. 82 Pt. 2. pp. 329-410 Sept. 1954.

For more than a century facts have been recorded by many observers which could be interpreted as evidence that the climate of New Zealand, and of the eastern portion of the South Island in particular, had within the recent past become colder and drier. Such records, often simple statements of observed facts without attempt at interpretation, came from local observers in many branches of natural history. The earliest record known to the reviewer is from Lieut.-Governor Eyre, who climbed Mt. Tapuaenuku in central Marlborough before 1850, and mentioned that his party had found dead totara logs of appreciable size at an altitude of 6,000 feet, i.e. far above the timber line. Indeed if the altitude given was correct, it was almost above the vegetation line. From time to time, other observers, notably geologists, recorded other observations which, they argued, pointed equally to warmer climates in the quite recent past. Speight was probably the principal geological exponent of the recent warm period theory. Of more recent years, ethnologists entered the field in greater numbers and deduced similar opinions from accumulated pieces of evidence drawn from Maori history and particularly from moa remains and their distribution and locations. Quite recently pedological phenomena have induced at least one pedologist to put forward a similar hypothesis of post-glacial climatic change in Canterbury. Holloway has accepted *as an hypothesis* the climatic change so postulated by these numerous colleagues. In this light he has examined the structure and the distribution of forest types throughout the South Island, with special emphasis on Southland and Westland, where the most intensive and careful recent surveys and enumerations have been done. The result makes enjoyable, if not easy, reading.

The present reviewer cannot blind himself to the fact that much of his own pleasure in the perusal was subjective and personal. Holloway describes salient and pertinent features of forests through which chain upon chain of wearisome traverse lines were cut thirty years ago and more; where swags were manhandled for mile upon endless mile. It is possible to read here of those forests and to visualize again the exact points on the self-same creeks where beech meets rimu still, where mountain beech ousts silver beech and vice versa, where cabbage tree and kowhai stand over mouldering stumps that can still be recognized as matai. But it is impossible to do such reading without experiencing an unscientific and unreasoned nostalgia for the old familiar places, and for stands that will be no more. The end

point of Holloway's theme is that in any case, they never could have been again, and that one and all they were relics from an older and kindlier, even if possibly a wetter, climate. The admitted extension of the theme is that other and similar forests existed and were slowly destroyed by natural change long before man, either civilized or uncivilized, took a hand in their destruction.

Holloway is by no means dogmatic in his assertion. Carefully and plainly he points out that he regards the matter of significant climatic change within the past seven centuries as *no more than an hypothesis*, to be tested and re-tested in the light of every relevant scientific discipline before it is accepted. One fears that too many readers will overlook his warnings and credit him with doctrines to which he is not yet fully committed; but if they do, the fault is not the author's. Accepting this idea as an hypothesis only, he examines the forest features which can be interpreted in that light, and he quite frankly admits that some he can as yet interpret in no other light. His conclusion is that "N.Z. forests are a peculiarly complex agglomeration of relic types of forest and a host of new types in process of adjustment"; but he again warns readers that even if forests do appear to uphold his hypothesis, it still cannot be regarded as fully proved until it can be shown that "native grasslands and soils bear the same stigmata of change." He pleads for no hasty verdict: for no conclusive pronouncement by those who have not synthesized countless details into a broad and panoramic picture with emphasis on outstanding and significant features. His technical warnings here too are cogent and to the point. No slavish focusing of vision on methodology of ecology important though it be, for "methodology can become a fetish dressed up in ponderous verbiage, but divorced from reality." No "summer-day-forest-margin" reconnaissances of forests yield valid opinions or conclusions, unless they have been checked by the rigorous discipline of mid-winter studies in the less accessible heart of the forest. It is a stoic régime that he prescribes, and those who know his work are aware that he has ever followed his own stoic prescriptions. He is no hedonist in his devotion to his chosen science, no "gentle and happy scholar of flowers". And his thinking is as disciplined and rigorous as are his physical exertions. It is difficult to imagine who could effectively criticize it without close examination of at least his test areas, over and over again on the ground—a process which would almost lead one back to the excessive and ponderous methodology which he deprecates. The reviewer frankly admits that he is much attracted by the interpretation of the history of several stands known to him personally. There is some doubt in his mind about the theory of the "reversals" which is developed primarily to explain the altitudinal sequences of tree species in the forests of the Western Waiau and of the Longwood Range in Southland. The phenomenon of mid-slope masses of rimu forest, with silver beech forest above and below, has long been known and has furnished abundant matter for inconclusive debate. Holloway's reversal theory is attractive, and yet

one has an uneasy feeling that it is just so attractive as to be suspect. Riparian and fringing stands of silver beech do occur as the result of stream dispersal of seed from upland forests, and the upland forests do creep downhill by the slow terrestrial spread of seedlings. (Holloway favours wind-distribution of seed as the agency for this latter movement. As a minor point, one queries this and favours gravity and perhaps surface wash.) The crux of the reversal theory, however, is that then the riparian stands turn and spread uphill again, through and to the destruction of the lower podocarps; and the mid-slope stands of these are thus caught in a pincer movement between the beech seedlings coming up by a land route from riparian stands, and those coming down by a land route from the upland stands. It is not uncharitable, one would say, to bring in a verdict of not yet proven, even whilst admitting that the hypothesis neatly fits many facts of present distribution.

The difference which Holloway stresses between this new hypothesis and the classical theory of climatic climax forests as propounded by Cockayne and others is that the old theory postulated "immense time intervals of stable climate". For this, there is now substituted (1) the hypothesis that the local climate began to change for a colder and drier climate about seven centuries ago, and (2) the admission that the climatic trend then initiated may have already altered, or even reversed, before it has exerted its full potential effect on either forests or grassland vegetation.

The admission, whilst candid and honest, makes any deductions about desirable and concordant practical forestry measures almost impossible. The author's plea does not go beyond calling for recognition of the existence of "climatic tides" of comparatively short phase in terms of geological time; and the statement that "forest or range land policies prepared in ignorance of them must inevitably in the long run, fail." He recognizes the dilemma of the forester in such a case, and wisely refrains from suggesting any forest measures or policy. He claims, in this article of eighty quarto pages, no more than that he has "declared the debate open", and that more information still hidden in the forests must be gained by study more laborious and detailed than anything that has been attempted to date.

With this modest conclusion, no one can take issue; but it offers no guide for the practising forester faced with the problem of regenerative or replacement prescriptions for the present day cut. Perhaps the furthest that anyone could go in policy statement would be to say that the answer for practical forestry would seem to be that the safest trend should be towards short rotations and species suited to them. In that way there would be the greatest chance to have at least one crop rotation, and perhaps more, completed within a single phase of the one "climatic tide". It is not a happy maxim for foresters schooled to think and plan in terms of the older classical theory of immense time periods of forest stability.

It would be unjust for any reviewer to go further than this; and

even this is putting words into the author's mouth. The debate that is declared open by the article is as yet between the scientists; and the practical forester is only in the audience. But it behoves him to be an appreciative and attentive listener. The article (it is to be hoped it will be reprinted as a separate work in a permanent binding) should become a bedside book for N.Z. foresters for many years. No single and cursory perusal can do it justice; and in most cases, would only do the reader harm. Read diligently and repeatedly, it will mould one's thought and stimulate the faculty of field observation; but no one, the author least of all, will expect a reader to accept it as dogma.

A final word of unqualified commendation must be said for the author's diction and presentation of a most complex subject. The reviewer, who has waded in many sloughs and mires of ecological jargon, cannot recall any article of comparable length and complexity that was more clearly and lucidly presented, yet with scarcely a phrase that is not intelligible without any ambiguity to a reasonably literate layman.

C.M.S.

RESULTS OF THE ARCHBOLD EXPEDITIONS. PAPUAN
NOTHOFAGUS. C. G. G. J. van Steenis—*Journal of the Arnold
Arboretum*, Oct. 1953—pp. 301-374.

In 1938-39 the third American Archbold expedition to New Guinea confirmed that extensive forests at higher altitudes (1,000 to 3,000 metres) throughout New Guinea contained trees akin to the southern beeches. The general descriptions of these forests, contained in the report of the expedition, indicated some remarkable floral affinities with New Zealand. The first details of the beech-like trees was contained in a work by an American botanist, Langdon (*The Comparative Morphology of the Fagaceae I. The Genus Nothofagus*. Bot. Gazette, Vol. 108, No. 3, 1947.)

In this present work the well known Dutch botanist, van Steenis, has dealt with the material of the expedition as well as other specimens collected before and after, designating it *Nothofagus*, and describing sixteen species and some varieties.

Before giving the formal descriptions, van Steenis expounds the significance of the New Guinea *Nothofagus* to plant geography, maintaining that such an extension to the known distribution might well have been expected. Then, in a short section on "Parasites of *Nothofagus*", a favourite topic for European plant geographers, he comments on the peculiar distribution of *Cyttaria*, but omits any mention of the more important New Zealand parasites, *Elytranthe spp.* The morphological characters of twigs, leaves, flowers, and fruits are dealt with in detail, and a comparative table is given of these and other characters for *Fagus* and *Nothofagus*.

Van Steenis has then attempted a subdivision of the genus, based