COMMENTARY ON PAPER

Mosaic or Cyclical Regeneration in North Island Podocarp Forests
(R. J. Cameron)

By JOHN T. HOLLOWAY

In his tentative application to North Island podocarp forests of ideas and hypotheses advanced by Richards, Cameron has plunged deeply into difficult waters.

Admittedly, as has been fully recognized since the earliest days of botanical endeavour in this country, certain types of New Zealand podocarp/hardwood forest closely resemble, structurally and floristically, sub-tropical rain forests and montane tropical rain forests. But does this superficial resemblance extend further? Do these New Zealand podocarp/hardwood forests behave in similar fashion to their subtropical or montane-tropical counterparts? Can the various hypotheses advanced or discussed in Richards' book "Tropical Rain Forest," be appropriated and applied in solution of New Zealand forest conundrums?

The basic notions, those of mosaic structure with cyclical regeneration of the forest dominants, of forests stable in the aggregate though made up of a host of minor species groupings of more or less constant composition but inconstant in distribution in both time and space, are not entirely novel to New Zealand botanists and foresters. The writer's very first interest in the subject of forestry was aroused when, as a boy, he was privileged to hear these ideas debated, over a billy fire, by Dr. L. Cockayne, Dr. J. E. Holloway, Messrs. G. Simpson and J. S. Thompson, and, memory has it, either Prof. J. Lotsy of Holland or Dr. Du Rietz of Sweden. That Richards could discuss these ideas (previously advanced by Aubréville) with an air of novelty was, to the writer, the most surprising thing in Richards' book.

With respect to New Zealand forests, dissatisfaction with the "linear-succession" ideas with podocarp containing stands regarded as pre-climax and with the podocarps destined to inevitable replacement by hardwoods, is no new thing. These ideas were altogether too facile and, on close enquiry, too improbable to be held for long. But likewise, mosaic or cyclical regeneration theories have also been given no small measure of consideration. The fact that little or nothing has been published concerning such theories is not disproof of this: it is simply proof that no satisfactory evidence has been forthcoming in their support.

The difficulty has been that it has never been possible to demonstrate, in the field, all stages in possible regeneration cycles. A host of variations on the theme, replacement of podocarps by hardwoods, can be described; but rarely can instances of the complementary process, replacement of hardwoods by podocarps, be found. Where such replacements do occur it is found, almost inevitably, that

secondary successions are involved. Time and time again, in primary forest, there are indications of tendencies toward cyclic regeneration of forest dominants but, invariably, the regeneration cycle fails at a critical point. No complete cycle has ever been described. In a ten-year search of South Island forests, no possible case has yet been located.

With respect to these South Island forests, the hypothesis has recently been advanced (in a paper now in press) that this failure is consequent on recent climatic variation hostile to the podocarp species, i.e., the idea is put forward that the forests no longer behave as they once did. In other words, irrespective of the original character of the forests (they may once have been, in part, mosaic climax forests with cyclical regeneration) present trends are toward the elimination of the podocarp species, trends paralleling those hypothecated under the older linear-succession theories. And evidence accumulates that comparable phenomena are displayed in North Island podocarp/hardwood forests though, for valid reasons, to a less extreme degree.

Cameron's cursory dismissal of this probability, and it is a probability rather than a possibility, must be disputed. It cannot be assumed for one moment that the forests are stable, regenerating, cyclically or otherwise, century after century, millenium after millenium. It is but a matter of ten thousand years or so since the close of the last ice age and there have been many fluctuations in climate since then; and ten thousand years is a very short space of time when measured against the life-span of a podocarp. In the behaviour of the forests, therefore, a constant state of change must be anticipated rather than a degree of stability sufficient for establishment of more or less regular regeneration patterns.

Again, Cameron's choice of the Whirinaki Valley podocarp/hardwood forests for analysis in terms of Richards' and Aubréville's ideas must be criticized as unfortunate. These, beyond dispute, are seral forests, dating only from the years of the last Taupo eruption. They are less than two thousand years old and palpably have not attained to any degree of equilibrium with their environment. Their status is that of the West Taupo forests described by McKelvey in this Journal last year. Cyclic regeneration patterns are not to be sought in forests such as these where, unquestionably, we deal with simple linear successions and with secondary successions consequent on Maori fires.

In the writer's opinion, if mosaic patterns are to be sought and studied, this should be in the surviving lowland podocarp/hardwood forests of the North Island, forests remote from centres of recent vulcanicity, e.g., in the forests of the Taranaki and South Auckland lowlands. These are likely to be older forests than any others in the country. They may have survived the period of the last ice advance with but slight modification. Regional climates, despite recent variations, may still remain podocarp favourable. The forests

may be true climax forests displaying mosaic or cyclical regeneration patterns.   If so, then study of them could serve a very useful purpose. Elucidation of the patterns would be of immeasurable assistance in evaluation of trends and tendencies in other forests.   Cameron's paper serves a very useful purpose in high-lighting this research need.