GEOLOGICAL NOTES

CORRELATION OF NEW ZEALAND AND EUROPEAN MIDDLE TERTIARY

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INTRODUCTION

Eames et al. (1962) correlated the Waitakian Stage of New Zealand with the Stainforthi Zone of Trinidad on the evidence of two planktonic Foraminifera, *Catapsydrax dissimilis* and *Globorotalia dehiscens*. They regarded the Stainforthi Zone as lower Miocene, and they accepted Hornibrook's (1958) correlation of the Duntroonian Stage of New Zealand with the Rupelian Stage of Europe. They therefore postulated a major stratigraphic break between the Duntroonian and Waitakian stages, and they cited a bored erosion surface at an unspecified locality as additional evidence.

Hornibrook had suggested a Rupelian age for the Duntroonian and Waitakian stages because he considered the overlying Otaian Stage to be Chattian in age on the indirect evidence of correlation with the Indonesian “e” Stage; but Eames et al. considered the Otaian to be much younger than Chattian. The only direct paleontological evidence of the age of the Duntroonian Stage is contradictory: the benthonic smaller Foraminifer *Rotalia tina suecigera* suggests correlation with the Alazan Formation of Mexico, thought to be Oligocene, whereas the fossil whale *Kekenodon* suggests a Miocene age according to Kellog (in Cloud, 1956).

Eames et al. considered *Globorotalia dehiscens* to indicate an age not older than that of the Stainforthi Zone, but Jenkins (1960) had already given reasons for suspecting that this species has a longer range in New Zealand than in Trinidad. Consequently the Waitakian Stage might well be older than the Stainforthi Zone.

Neither of the correlations given by Eames et al. for the Waitakian and Duntroonian stages can be substantiated, and the paleontological evidence for a stratigraphic break is unsound.

STRATIGRAPHY AND GEOLOGICAL HISTORY

Middle Tertiary stratigraphy and inferred geological history in New Zealand are strong evidence against the suggested break. So far from being a period of regression in New Zealand, the middle Tertiary is generally considered to be the time of greatest transgression within the Tertiary Period (Wellman, 1953, fig. 5; Fleming, 1962), and marine strata of Whaingaroan, Duntroonian, and Waitakian age are probably more widespread than those of any other Tertiary age over the present land area of New Zealand. The Whaingaroan, Duntroonian, and Waitakian stages are naturally grouped together in the Landon Series because, in contrast to other Tertiary stages, they are generally represented by light-colored and highly calcareous sediments, and they are considered to have been deposited under continuing similar conditions that were unusual for New Zealand.

The best defined lithological break within the Landon Series is not between Waitakian and Duntroonian, but between Duntroonian and Whaingaroan. A still more strongly defined lithological break occurs at the top of the Waitakian stage in several parts of New Zealand, and is shown to be an angular unconformity over a large part of West Auckland by Kear and Schofield (1959) and Hornibrook and Schofield (1963). Relatively small faunal changes between Whaingaroan and Duntroonian and between Waitakian and overlying Otaian, probably indicate small age differences across these well defined lithological breaks. Disconformity between Duntroonian and Waitakian is present in neritic facies at many places from West Auckland to Otago, but is less well defined and less widespread than the unconformities at the base of the Duntroonian and the top of the Waitakian.

The stratigraphic break suggested by Eames et al. would imply that an interval of total regression divided the period of maximum transgression represented by the Landon Series. In epicon-