

to the Onychophora and other terrestrial invertebrates, to the moas and kiwis among birds, to the Tuatara among reptiles, and the bat *Mystacina*—they may have originally been Australian, or Malayo-Pacific, or even (conceivably) Austral elements. Forster (1961) has recently used the term "Archaic" for such organisms, but they vary greatly in age. Within an endemic element, it is always important to distinguish the primary endemics (due to local evolution) from the secondary (or relict) endemics due to extinction elsewhere of formerly widespread groups. In New Zealand the Apterygiiformes are evidently a primary endemic group, the Sphenodontidae a secondary endemic.

Cockayne's name Palaeozelandic was proposed for a special segment of the endemic element, for "genera now more or less widespread", of Tertiary New Zealand origin, "which had originated on her own soil". It thus refers not to the secondary or relict endemic elements but to the primary endemic element and to groups of New Zealand origin that have spread to other regions. Oliver (1925, p. 122) commented that the Palaeozelandic Element is of mixed origin, and later discoveries, particularly of fossils, have shown that some of its members are Austral rather than "Zelandic" and thus secondary endemics, but the concept of New Zealand as a site of Mesozoic and Tertiary evolution of groups that have spread to other regions remains a valid one (e.g., for the species of *Hebe* in Chile). The "Palaeozelandic" is, however, a category more useful to biogeographers of recipient countries than to the New Zealander.

Hutton listed Palearctic and Nearctic elements in New Zealand, but most of his examples would now be classified under different headings. The following species of land and fresh-water birds belong to groups that are otherwise almost entirely north temperate: the New Zealand Scaup (*Aythya novaeseelandiae*), the Auckland Island Merganser (*Mergus australis*, formerly also on the mainland), the South Island Pied Oystercatcher (*Haematopus ostralegus finschi*), and the Black-billed Gull (*Larus bulleri*, a member of the *ridibundus* group). Moreover, it is at least a plausible hypothesis to suppose that the endemic Charadriiformes (species of *Charadrius*, *Pluvialis*, and the endemic genus *Anarhynchus*) may have arisen as resident populations from Holarctic migrant ancestors. There are also many plants (*Euphrasia* according to Du Rietz, 1948) and invertebrates that form similar disjunct outliers of Holarctic groups. To be sure, such elements may have formerly been cosmopolitan and have come by either Australian or Malayo-Pacific dispersal avenues to New Zealand before their extinction over vast intervening areas on their presumed routes. But in the absence of definite evidence that such organisms were once Australian or Malayo-Pacific, a Holarctic element has been allowed in the classification. Marine organisms that are bipolar or antitropical in temperate or sub-polar latitudes (e.g., *Catharacta skua* and *Fulmarus* among birds; *Mytilus edulis* and the King Crab *Lithodes* among invertebrates) also present classificatory problems but have not here been given the status of a separate element. The examples cited are Neoaustral elements in the New Zealand fauna, distributed in the west wind drift, and their broader antitropical distribution is a matter of global, rather than local biogeography.

Such difficulties in classifying minor elements do not detract from the importance of the three chief dispersal avenues—Malayo-Pacific, Austral and Australian—that evidently contributed the main elements of the New Zealand biota. The names here proposed for these elements are submitted for scrutiny by specialist workers in botany and zoology in the hope that a single terminology may lead to greater intergration and clarification of biogeographic concepts and to a greater liaison between the separate disciplines in this field.