

Gangamopteris) have not yet been recorded. In the Upper Permian, by contrast, a strong Tethyan affinity is shown by the reef-corals and fusulinid Foraminifera of Northland (Hornibrook, 1951; Leed, 1956).

In the Triassic and Liassic, benthic faunas are sufficiently distinctive (endemic) to have given rise to the concept of a Maorian Province (including New Caledonia) within the Pacific-Arctic Realm that shows some regional differences from the Tethys, but organisms with planktonic dispersal (ammonites in particular, and some Pteriod bivalves) show that the Tethyan influence remained strong. It becomes dominant in the Middle and Upper Jurassic, when immigrants from the Tethyan Realm (belemnites, ammonites, Trigoniidae, Buchiidae, the brachiopod *Kutchithyris*) dominated the fauna (Marwick, 1953).

The oldest Cretaceous fauna known (Aptian), in the Korangan Stage (Taitai Series), includes one notable Australian genus (*Maccoyella*) and others of more widespread, probably Tethyan, affinity. In the Middle Cretaceous, however, there appear a few elements of predominantly southern distribution, such as the lamellibranchs *Iotrigonia* (s. str.) and *Eselaevitrigonia*, along with further Tethyan (or perhaps cosmopolitan) forms. In the Upper Cretaceous, southern elements are stronger, and include ammonites, bivalves (*Lahillea*, *Pacitrigonia*) and gastropods related to those of South America and Seymour Island and Foraminifera like those of Burwood Bank, Central and South America (Hornibrook, 1953), in addition to Australian elements such as the Dimitobelidae (belemnites). The Cretaceous vegetation includes many southern Podocarps, *Nothofagus*, and Proteaceae (Couper, 1960). In the Cenozoic, faunas and floras show southern, Australian, and Indo-Pacific influences (for the latter, see Marwick, 1925), but the Indo-Pacific influence (successor to the Tethyan of earlier times) is certainly dominant from middle Eocene to Upper Miocene (Fleming, 1962, Fig. 18). In the Pliocene, however, with regional cooling that culminated in the Pleistocene, the Indo-Pacific influence dies down, and southern and Australian influences are important among the newcomers to the fauna (Fleming, 1952).

As a broad generalisation, therefore, the three major elements used in classifying the geographic affinities of the living fauna and flora can be distinguished in their fossil history. The southern influence was apparently dominant in the Early Permian, the Upper Cretaceous, and the Plio-Pleistocene, and the Tethyan, Indo-Pacific or "tropical" influence in the Upper Permian, middle and later Jurassic, and middle Tertiary. The Australian influence, one suspects, was always present, but is perhaps not always recognised, as Australia also shared in the other two elements (southern and tropical), so that immediate and ultimate origins are hard to disentangle. At no time since the Jurassic can we affirm that any one element was completely lacking among the invaders that characterised successive periods.

TERMINOLOGY

The names used by successive reviewers for the same elements have varied (Table I). Classification of biotic elements is an exercise in generalisation. The broader a generalisation, the more worth-while it is in summarising experience. The claim is sometimes made that land plants, land animals of different groups, and marine organisms are so distinct in ecology and vagility that they are subject to different rules and cannot be integrated into a single biogeographic scheme. Granted the many differences in colonising ability, however, the dispersal avenues defined by physical factors (currents of air and water, bathymetry, shore-lines, and climatic zones) tend to be shared by different organisms of contrasting habits but of similar geographic origin, especially in a country like New Zealand, where any likely Tertiary land connections have been "isthmian links" flanked by sea,