

into two simple facies (three in 1956) is probably not applicable in detail. Not all sediments included in his Alpine Facies are redeposited; grading is by no means uncommon in his Hokonui Facies. Nor does fossil evidence support a rigid two- or three-fold geographic distinction of sedimentary environments. It seems useful nevertheless, as noted by Suggate (1961), to recognise the Torlesse Group as a unit because of its geographic discreteness, its lack of unconformities, its broad lithological distinctiveness, and not least its usefulness as a mapping unit.

Recognisable fossils have now been found in three areas in low grade (Chl 2) schist close to Torlesse Group sediments, and we have thought it useful to include these collections in the list.

Of these, the most important are fossils from the Kakahu area (S102) in weakly schistose greywacke, limestone, and chert. None of these collections are diagnostic as to age, and there seems yet to be little evidence, paleontological or otherwise, to support the assumption (cf. Wellman, 1953, 1962) that the Kakahu rocks do not form part of the Upper Paleozoic and Mesozoic Torlesse Group or its metamorphosed equivalents.

Two *Terebellina* collections in Chl 2 schist are also listed: one in the Arahura valley west of Browning Pass (S58/502), and another (doubtful) near Kellys Hill (S59/536).

NATURE OF TORLESSE GROUP FAUNAS

Fossil evidence suggests that the group represents a span including some of Permian time, Middle and Upper Triassic, Upper Jurassic, and Lower Cretaceous. No Lower Triassic or Lower or Middle Jurassic fossils have yet been found, but this cannot be taken to indicate that no rocks of these ages are present.

TABLE I.—FAUNAL ZONES IN SOUTH ISLAND ROCKS OF THE TORLESSE GROUP.

Zone Species	Local Stage in which Zone Species Occurs	Approximate Overseas Equivalent
<i>Inoceramus ipuanus</i>	Motuan (upper)	Albian
<i>Inoceramus urius</i>	Motuan (lower)	Albian
<i>Inoceramus kapuus</i>	Urutawan	Albian
<i>Inoceramus warakius</i>	Mokoiwian	Neocomian-Aptian
<i>Buchia plicata</i>	Puaroan (upper)	Lower Tithonian
<i>Hibolithes brownei</i>	Puaroan (lower)	Lower Tithonian
<i>Inoceramus galoi</i>	Heterian	Lower Kimeridgian
<i>Monotis richmondiana</i>	Warepan	Norian
<i>Halobia</i> sp.	Oretian-Otamitan	Carnian
<i>Daonella apteryx</i>	Kaihikuan	Ladinian
<i>Atomodesma trechmanni</i>	Not named	Kazanian

Several species not listed above are useful as zonal markers in the Torlesse Group, but are not known to occur elsewhere.

Marine invertebrates are much the most common fossils, but fronds and spores of land plants are preserved in some beds. An ichthyosaurian reptile is recorded from one locality (S72/498) in a rich Kaihikuan brachiopod-mollusc fauna; while recent discoveries include fish vertebrae, in a loose boulder near Arthurs Pass (S59/534), and a decapod crustacean, in a Jurassic conglomerate in the lower Hurunui River (S62/784).