

The classification of the Tertiary and Mesozoic rocks is as follows :—

Series and Approximate Thickness.			Beds.	Age.
			Beaches, dunes, terraces, river-gravels, volcanic ash, pumice silts	Recent and Pleistocene.
Patetere (300 ft.)	..	..	Rhyolitic tuffs, subaerial, in places subaqueous	Pliocene.
Tongaporutu (100 ft.)	..	..	Yellow sandstone	Taranakian (Upper Miocene).
Mohakatino (400 ft.)	..	..	Tuffaceous sandstone, mudstone, and limestone; Whareorino andesite	? Awamoan (Miocene).
Mokau (600 ft.)	..	..	Sandstone and shelly conglomerate; coal ..	Awamoan (Miocene).
Mahoenui (400 ft.)	..	..	Mudstone and sandy limestone	Hutchinsonian (? Oligocene).
Te Kuiti and Whaingaroa (500 ft.)			Limestone and calcareous sandstone and mudstone; argillaceous and glauconitic sandstone; coal	Ototaran (Oligocene).
			Serpentine	Unknown.
Puaroa (2,000 ft.)	..	..	Conglomerate, grit, sandstone, and mudstone	Upper Jurassic (? Cretaceous).
Kawhia (10,000 ft.)	..	..	Mudstone, sandstone, grit, and conglomerate	Bathonian-Oxfordian.
Herangi (5,000 ft.)	..	..	Greywacke, argillite, grit, conglomerate, sandstone, and plant-beds	Lower Jurassic.
Otapiri (3,000 ft.)	..	..	Sandstone, grit, and argillite	Rhætic.
Marakopa (1,000 ft.)	..	..	Greywacke and argillite	Noric.
Whakahau (700 ft.)	..	..	Coarse sandstone, greywacke, and argillite ..	Carnic.
Oreti (2,500 ft.)	..	..	Conglomerate, greywacke, argillite, banded sandstone	Lower Carnic.
Moeatoa (4,000 ft.)	..	..	Igneous conglomerate and minor sandstone ..	Ladinic ? or older.

Moeatoa Series.—North of Ngukuhakare Bay there outcrops for 180 chains along the coast a coarse, indurated conglomerate composed chiefly of pebbles and boulders of granites and porphyries ranging in size from less than ¼ in. to 8 ft., and smaller pebbles of sedimentary rocks up to 8 in. in diameter. The boulders are angular, subangular, and rounded, the cementing medium is hard and compact, and the conglomerate is badly sorted and rudely stratified. Near Ngukuhakare Bay it contains pebbles of hard, dark, fine-grained greywacke. Occasional beds of sandstone, striking north-north-west and dipping east at 25° to 30°, occur near the top of the series, but in the lower part, where sandstone bands are absent, it is difficult to make out any bedding. The total thickness of the beds is estimated at 4,000 ft.

On the accompanying map the series has been shown as Triassic, but it may be older; for throughout the Mesozoic rocks of New Zealand no similar beds have been found, the one most resembling it being a conglomerate near Clinton, described by Ongley, to which a Permian age is assigned on fossil content. No contact with underlying beds was seen, the conglomerate at its southern end being cut off by a fault with a downthrow to the south of more than 1,000 ft. Its relation to the overlying beds is not clear, but the break which is taken as the top of the series may well be erosional.

Oreti Series.—Overlying the Moeatoa Series are conglomerate and sandstone beds, followed by greywacke, argillite, and banded sandstones, striking generally north-west on the coastal section, and having a general north-east dip of 30°. Red, pink, or grey bands of coarse material, from 2 in. to 15 in. thick, occur at intervals. They may be tuffaceous, as Hector suggests for similar beds in the Oreti Series in the Hokonui district. No fossils were found in this section, but on stratigraphic and lithologic grounds the beds are placed in the Oreti Series.

Whakahau Series.—Beds containing *Maoria problematica* (*Mytilus problematicus*), which is the type fossil of the series, occur at several localities on the western limb of the syncline, and a good collection was obtained in an argillaceous bed in Whakahau Creek, a small tributary entering the Kiritehere Stream from the south near the mouth. On the eastern limb of the syncline it occurs in Oamaru Creek, Orahiri Survey District, in beds faulted against *Pseudomonotis* beds. It is now also recorded for the first time on the coastal section at Kawhia, between Arawi Point and the *Pseudomonotis* beds to the east. The series, which consists of argillite, greywacke, and coarse sandstone, is of Carnic age.

Marakopa Series.—Conformably following the Whakahau Series is a succession of sandstones and argillites, which is well developed in the south-west corner of Marakopa Survey District. This series is characterized by *Pseudomonotis richmondiana*, which occurs in crowded masses in a fine-grained grey sandstone outcropping on the coast. This fossil has also been found in abundance in Whakahau Creek, in a quarry in Kiritehere valley, and on the saddle between the Waikawau and Kiritehere streams with intruded andesite. It also occurs on the eastern limb of the syncline in the Triassic rocks extending north from Wairere Falls, and in the gorge of the Mokau down-stream from this point. Beds containing obscure carbonaceous remains outcropping on the coast just south of Kiritehere Stream are taken as the closing member of the series, which according to Trechmann's classification is of Noric age. Similar carbonaceous beds occur in some of the upper branches of the Waikawau River.

Otapiri Series.—Conformably overlying the *Pseudomonotis* beds at Kawhia is a series of beds 3,000 ft. thick characterized by the Rhætic brachiopod *Clavigerina* and correlated with the Otapiri Series. The beds extend south into the Te Kuiti district, and, though no Rhætic fossils have been found, the series must be well represented here. Accordingly the beds between the Marakopa Series and the overlying beds containing *Pseudaucella marshalli* are placed in the Otapiri Series.