

The Tertiary Rocks of the Wanganui—South Taranaki Coast.

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IN various publications during the last few years we have endeavoured to solve the faunal and stratigraphical relations between the various members of the series of rocks exposed on the coast-line between Wanganui and Hawera. We have stated that as far as the mouth of the Tangahoe Stream the dip of the rocks is such that older and older strata are gradually exposed as one goes north and west. The strike of the strata, however, bends so far to the west that north of the Tangahoe the strata exposed on the coast-line become gradually younger, and repeat the series exposed between Patea and that place, though they are somewhat more fossiliferous.

At the mouth of the Waingongoro Stream, some four miles north-west of Hawera, the old post-Pliocene surface of erosion approaches closely to the present sea-level, and almost the whole height of the cliffs consists of detritus from Mount Egmont. At the base of this material there is in places a well-preserved shell-bed, the presence of which shows clearly that at the time the volcanic activity of Mount Egmont commenced the post-Pliocene surface of erosion was the floor of a shallow marine area. The absence of shell-bearing horizons at higher levels in the volcanic material shows either that elevation of the old sea-floor took place when the volcanic activity began, or that the sea was so shallow that the volcanic matter which was deposited soon accumulated to such a thickness as to build up a land surface. At the mouth of the Waingongoro Stream it is clear that the old fossiliferous surface had been elevated to a higher level than the present before the volcanic activity commenced. In this locality the present stream enters the sea through a gorge cut in the debris of volcanic material derived by erosion from the slopes of Mount Egmont, the sides of the gorge being about 100 ft. high. Some 400 yards along the coast to the south-east of the gorge the volcanic material of the lower part of the cliff abuts against the grey claystone of the district (called everywhere "papa"). The abruptness of the junction at once suggests a fault, but closer inspection shows that the papa wall is an old gorge-cliff, and evidently formed the south-east side of the post-Miocene Waingongoro Valley. About 300 yards north of the Waingongoro Stream there is a similar abrupt appearance of papa, which marks the cliff boundary of the old valley in this direction. It is thus evident that previous to the activity of Mount Egmont the Waingongoro Stream had eroded a valley which was nearly half a mile wide, and there is at present no means of telling how far below the present sea-level the old floor of the valley lay. The depression of this old floor took place, and the land-level sank until the tops of the cliffs that then bounded the valley were submerged, when a beach-deposit with Recent marine shells was formed; volcanic detritus was, however, subsequently carried to the sea in such quantity that the shell-deposit ceased.

As has been mentioned, at the Waingongoro the trend of the coast intersects the strike at such an angle that successively younger beds are encountered as one goes north and west. At the same time the thickness of old claystone showing in the cliff is gradually narrowing, and at the mouth of the Kapuni Stream it has sloped below the present sea-level. Our hope of finding a succession of Tertiary beds which might connect the Whakino-Waihi horizon with that of older localities was thus frustrated on the coast-line to the south of New Plymouth. The country and coast-line north of New Plymouth to the mouth of the Urenui Stream is fully described in *Bulletin No. 14* of the Geological Survey. That detailed survey did not offer us much encouragement, for only thirty-four species of Mollusca are mentioned as occurring in the Onairo series, the youngest Tertiary series mentioned, and equivalent to the Upper Miocene. Apparently this list includes fossils from all outcrops in the district discovered by all observers up to the year 1912. No particular locality or station is mentioned by the writer of the bulletin as one in which a typical collection could be made.

During our brief visit to the district we found a considerable number of fossils near Uriti, where there is an old disused metal-pit of shell-rock, known as Wray's quarry, situate on the road up the stream about half a mile from the township. Many of the fossils are poorly preserved, and species determination is therefore unrecorded.

The following is a list of species, those extinct being marked with an asterisk :—

**Ancilla pseudo-australis* Tate
Anomia sp.
 **Antigona* sp.
Calyptraea novae-zelandiae Less.
 **Cardium spatiosum* Hutt.
 **Cerithidea* sp.
 **Cerithiopsis* sp.
 **Cominella* sp.
 **Crepidula gregaria* Sow.
 **Dentalium solidum* Hutt.
 **Diplodonta ampla* (Hutt.)
Dosinia subrosea (Gray)
 **Galeodea senex* (Hutt.)
 **Glycymeris globosa* (Hutt.)
 **Lima paleata* Hutt.
 **Lima* sp.

**Limopsis zitteli* Iher.
 **Macrocallista* sp.
Maetra scalpellum Reeve
Malletia australis (Q. & G.)
 **Natica gibbosa* Hutt.
Ostrea sp.
 **Paphia curta* (Hutt.)
 **Pecten* aff. *sectus* Hutt.
Psammobia aff. *lineolata* Gray
 **Sinum* sp.
 **Struthiolaria spinosa* Hect.
Turritella symmetrica Hutt.
Venericardia difficilis (Desh.)
 **Verconella conoidea* Zitt.
 **Verconella nodosa* var.
 **Zymene* aff. *lepidus* Sut.

Of this total of thirty-two species, nine are Recent, the percentage of extinct species being 71.9. *Lima paleata* is not recorded above the Oamaru limestone. *Galeodea senex* reaches its upper limits in the Awamoan beds. *Struthiolaria spinosa* has not a widely recorded occurrence, but is found in the Upper Miocene of the Trellissick Basin. The other extinct species, though they occur at lower horizons in the Miocene, extend also to higher ones. The species mentioned seem to imply an horizon not lower than that of Target Gully beds, and this is in accord with the suggestion due to the percentage of Recent species.