

## ART. XI.—Fossils from the Paparoa Rapids, on the Wanganui River.

By P. MARSHALL, M.A., D.Sc., F.N.Z.Inst., Hector and Hutton Medallist,  
and R. MURDOCH.

[Read before the Wanganui Philosophical Society, 25th October, 1920; received by Editor,  
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No complete collection of fossils has yet been recorded from the strata that crop out along the course of the Wanganui River. For the most part the strata contain but few fossils, and in those localities where organic remains are abundant the material in which they are embedded is pebbly, or it has a concretionary nature, which makes it difficult to extract the fossils in a condition that allows of exact identification. The most promising locality that is known at present is probably that of the Paparoa Rapids, some twenty miles below Taumarunui. Park\* was the first geologist to make any collections here, and he recognized some thirty species, the nature of which seemed to show that the strata were of a distinctly lower horizon than any that he found on the coast between Wanganui and Patea. A visit was paid by one of us to the locality in January, 1920, with the object of making as complete a collection as time and circumstances would allow. Two days were spent there, but the collection that was made did not contain a very large number of species. At the Paparoa Rapids the strata on the right bank of the river are almost horizontal, but on the left bank they have been disturbed by an extensive slip, and have locally a high easterly dip. The fossil-bearing rock is a fine, hard, bluish-grey sandstone, slightly concretionary in its nature, and large fossil shells are very conspicuous in it. The actual material of the sands is such as might well be derived from the rocks of Maitai age, of which the main mountain-ranges of the North Island are composed.

The following is a list of the species which were collected, the Recent species being marked with an asterisk.

*Ancilla* sp.; apex only  
\**Calyptrea novae-zelandiae* Less.  
*Chione acuminata* Hutt.  
\**Chione yatei* (Gray)  
*Cominella* aff. *intermedia* Sut.  
*Conus* sp.; a fragment only  
*Corbula pumila* Hutt.  
*Crassatellites attenuatus* (Hutt.)  
*Crassatellites tralli* (Hutt.)  
*Crepidula gregaria* Sow.  
*Cucullaea worthingtoni* Hutt.  
*Cytherea ensyi* Hutt.  
*Dentalium solidum* Hutt.  
\**Divaricella cumingi* (Ad. & Ang.)  
\**Dosinia anus* (Phil.)  
\**Dosinia subrosea* (Gray)  
*Epitonium lyratum* (Zitt.)  
*Glycymeris cordata* (Hutt.)

*Glycymeris subglobosa* Sut.  
*Limopsis zitteli* Iher.  
*Lvponia* aff. *ovulata* Tate  
\**Macra scalpellum* Reeve  
*Natica* (*Polinices*) *gibbosus* Hutt  
*Panope worthingtoni* Hutt.  
*Paphia curta* (Hutt.)  
\**Pecten convexus* Q. & G.  
*Pecten huttoni* (Park)  
*Struthiolaria cincta* Hutt.  
*Surcula* aff. *fusiformis* (Hutt.)  
*Turbo* aff. *superbus* Zitt.  
*Turritella semiconcava* Sut.  
*Verconella nodosa*. var.; not Recent  
*Verconella* aff. *dilatata*; fragment only  
*Voluta* sp.; not Recent

\* J. PARK, *Rep. Geol. Explor. during 1836-37*, p. 173, 1887.

There are only thirty-four species in this list, and many of them are represented by fragmentary material only, or they are filled with a hard and tough matrix. The hinge-teeth and apertures of many of the species are obscured, and this makes the identification a little uncertain. Only seven of the species are certainly Recent, and the percentage of Recent species therefore falls as low as 21. The small size of the collection, the fact that large species only were in a condition to be collected, and the uncertainty of identification in some cases make it unsafe to rely too closely on this percentage in correlating the strata with those of other localities in New Zealand.

The nature of the mollusca points rather to the Target Gully horizon, for there are only six species that do not occur there, and these species are found in horizons of much the same position near Oamaru or in the Treliissick Basin. On the other hand, the fauna of this stratum is of a distinctly older type than that of any of the coastal localities of the district in which we have collected fossils up to the present time.

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#### ART. XII.—*Tertiary Rocks near Hawera.*

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[*Read before the Wanganui Philosophical Society, 25th October, 1920; received by Editor, 31st December, 1920; issued separately, 27th June, 1921.*]

In the last volume of the *Transactions of the New Zealand Institute* we published lists of fossils from various localities on the coast-line to the north-west of Wanganui. During the past year we have been able to make collections on the beach at Hawera, some twenty miles farther along the coast in the north-west direction. Throughout this distance the rocks are of the same general nature as they are near Wanganui—in other words, micaceous sands and clays (the papa rock). If anything, the material is rather more sandy on the average than it is farther south. There is perhaps rather less mica, and black grains are rather more numerous among the quartz-grains. The strike of the strata changes a good deal. As stated in our former paper, the strike between Castlecliff and Nukumarū is, on the average, 70°. By the time Patea is reached it is as much as 100°, and still farther north, at the mouth of the Tangahoe Stream, on the coast opposite Mokoia, it is 145°. This shows clearly that there is a gradual swing in the strike as one proceeds to the north-west. The dip is always to the south-west and is always slight, and has an average of about 4°.

The direction of the strike and dip as related to that of the coast is such that older and older beds are exposed as one journeys north until the mouth of the Tangahoe is reached. At this point the trend of the coast is parallel to the strike of the strata, and as one goes still farther north younger and younger strata again begin to make their appearance. About 500 ft. of strata separate the lowest horizon three miles north of Waipipi from the horizon at the mouth of the Tangahoe Stream. The Waihi beach