

farther. The north-easterly slope of about 30 ft. per mile of their extensive accordant surfaces suggests that the Tukituki drainage system formerly covered part of the basin now belonging to the Manawatu. Remnants of terraces, shoulders on hill slopes, as well as mature surfaces and truncated upper valleys, occur at accordant heights at many points along the Ruahine Range and among the hills to the east.

The railway from Kopua to Makotuku is on the next lower prominent group of terraces in the Manawatu basin. The surface of this set is some 250 ft. lower than that of the highest group, and as it slopes down the Manawatu that stream had probably captured part of the old Tukituki basin at the time of their formation. In the Tukituki basin the terraces set next below the highest terraces are considerably lower than the corresponding group of the Manawatu.

The streams are still lowering their beds, and in addition to those mentioned there is a number of lower terraces, but, as none is wide, no long pause in down-cutting is represented. The local base-level of the Tukituki is about 100 ft. lower than that of the Manawatu.

STRUCTURE.

The great fault-belt along the base of the Ruahine highlands was not examined in detail. The few known faults seem to have an echelon pattern and, striking about south-south-west, make a small angle with the front of the range, which here trends a little west of south.

The hills to the east consist of tilted earth-blocks separated by strong faults which strike in a general south-west and south-south-west direction. This fault-belt in the area examined is six to seven miles wide and there are several strong sub-parallel faults as well as connecting fractures. The interfracture blocks, as judged from the dip of the young Tertiary strata that cover them, are tilted west at moderate angles. The faults are probably high-angle reverse faults, and there is strong evidence in the "drag" of beds along them that the blocks to the west, in addition to their upward movement, shifted horizontally toward the north-east.

The Oruawharo Range east and south-east of Takapau consists of a series of parallel dip-slopes of limestone and sandstone dipping west at moderate angles off the greywacke exposed for miles on the upthrow side of the fault along the east flank of the range. Northward these hills cease abruptly a mile south of Makaretu River. The fault along the east base of this range has been active within very Recent time. To the east, separated by the fault-angle valley of the Makarakeke, are the Tourerere Hills. This range, which continues north beyond the Tukituki Gorge, is also breached by the air-gap followed by the railway between Takapau and Waipukurau. Five miles south of Takapau the Oruawharo and Tourerere hills merge into a belt six miles wide of high broken country with many dip-slopes which continue far to the south-west. Here the Oruawharo Fault tends to die out and the greywacke no longer is exposed on its upthrow side, but a branch striking a little west of south becomes increasingly important. The south-west striking Rangitoto Fault offsets the Oruawharo Fault at its southern end to the west and brings greywacke to the surface at several points. The Waikopiro Fault, a little to the west, has a sinuous course. The Ruataniwha Fault, still farther west, crosses the main road a mile and a half west of Takapau, and, striking about S.30° W., has been traced to the Manawatu River.

A step on alluvial flats, in places 20 ft. high, is the surface trace of the last-mentioned fault, and proves movement along it of very late date. The Oruawharo, Rangitoto, and Tourerere faults also in places show as steps in the surface or as low narrow ridges.

STRATIGRAPHY.

Except that some series are not present in the area mapped this season, the rocks belong to the same groups as outcrop in those parts of the subdivision examined in earlier years.

Mesozoic (?) Greywackes.—Greywackes similar to those mentioned in last year's report occur on the upthrow side of several of the major faults. They are indurated, light-coloured, fine- and coarse-grained rocks, usually deeply weathered. No positive evidence of their age is available.

Raukumara Series.—East from Ormondville hard blue-grey mudstone containing *Inoceramus* outcrops on the upthrow side of the south branch of Oruawharo Fault. It overlies Mesozoic (?) greywacke and is correlated tentatively with the Mangaotane mudstone of the Raukumara Series. The *Inoceramus* fragments are not specifically identifiable.

Ihungia Series.—Mudstones containing foraminifera of *Ihungia* age and lithologically identical with the *Ihungia* mudstone of other parts of the subdivision occur in the Tourerere Hills. No older Tertiary rocks were observed this season.

Tutamoe Series.—Thick, coarse sandstones with a few mudstone bands near their base overlie the *Ihungia* beds with a sharp clean contact. Both series have the same strike and dip. The foraminifera prove the younger set to be of Tutamoe age. North-east along the strike the coarse sandstones rest on Mesozoic (?) greywacke and Mangaotane mudstone.

Mapiri Series.—About four miles east of Ormondville between the Rangitoto and Oruawharo faults there are outcrops of blue-grey mudstone that on its fossil content is placed in the upper part of the Mapiri Series. The relation of these rocks to the Tutamoe beds was not observed in this district.

Opoiti Series.—Massive sandstones with shell bands near their base and grading upward into finer sandstones occur in the same locality as the Mapiri beds, with which they appear to be conformable. The molluscs and foraminifera collected from these sandstones show that they belong to the Opoiti Series. Similar beds occur west of Rangitoto Fault, where they rest on greywacke and have at their base a shelly conglomerate containing pebbles of greywacke and sandstone. The thicker oysters and