

TOPOGRAPHY.

The Tararua Range, 3,500–2,000 ft. high, trends east of north along the west of the subdivision, and has at its foot a depression ten miles wide and 400 ft. above sea-level, along which runs the railway past the chief settlements and the towns, Eketahuna and Pahiatua. East of this lowland are the parallel Waewaepa Range (2,000 ft.) and Puketoi Hills (2,600 ft.). Between the Puketoi Hills and the coast there is a series of high steep-sided ridges with accordant summits, evidently remnants of a dissected plateau.

STRUCTURE.

The major features of the subdivision trend east of north parallel with the coast and the main range, and consist of a set of alternating ridges of Cretaceous beds and valleys filled with Tertiary beds. The topography corresponds with the structure—the ridges are anticlinal, the valleys synclinal. The folds, however, are corrugated, and are really anticlinoria and synclinoria. The Tertiary beds in the synclines are well bedded and not tightly folded, so they can be readily mapped and their structure elucidated: but the Cretaceous beds in the ridges are, at best, poorly bedded and are tightly folded, so that they afford only scant evidence, in places insufficient to show the structure. Further, the boundary between ridge and valley is not in all places evident. At many places strong faults are shown by wide crush-zones; at others it is impossible to be sure of the faulting, the only evidence being a steep bluff of hard Cretaceous bed standing up as a strike ridge over the eroded softer Tertiary beds. Where the evidence is good these steep faces are found to be fault-line scarps of bedding faults, in places passing into flexures.

The structure is most readily described by beginning at the coast and crossing the grain of the country inland. At Cape Turnagain the middle of a syncline is occupied by beds of limestone (Te Aute limestone) underlain on both flanks by beds of mudstone and tuffaceous sandstone (Mapiri beds), which were found to be 1,500 ft. thick on the west limb. These are underlain by more massive mudstone (Morere mudstone), 2,500 ft. thick, and these in turn by much broken Cretaceous chalky limestone, mudstone, and greensandstone. The Tertiary formations are parallel, and separated only by thin pebble-beds marking the erosion intervals. They dip gently (5° – 10°) near the middle of the syncline, and gradually steepen on the flanks to 80° , and are, in places near the Cretaceous rocks, overturned and highly contorted. On the coast 60 chains north of Whangaehu the Tertiary beds are seen dipping 80° east. They have a conglomerate of Cretaceous boulders at the base, and are underlain by crushed and distorted Cretaceous beds, broken and compressed into steep and vertical folds. Ten miles to the south along the strike the same Tertiary beds are much contorted, and dip 80° westward below Cretaceous beds with the same attitude. Near the contacts the Tertiary beds are typically steep and broken; away from them they dip gently in wide, open folds. This shows that the stresses were relieved by movements at the contacts of the strong Cretaceous and weak Tertiary beds folding them steeply, overturning them, breaking them along wide belts into breccia and pug. While the Tertiary beds are steeply folded only near the Cretaceous, the Cretaceous beds generally are tightly folded. The syncline that has its trough at Cape Turnagain, conforming to the regional strike, trends west of south, and is filled with Tertiary beds up to four miles west of the axis. There it is bordered by a parallel anticline four miles wide, of steep, vertical, and overturned Cretaceous beds. West of this again is another synclinal filled with Tertiary beds, vertical and broken at the contact with the Cretaceous and flattening out towards the axis at Te Awa Putahi, where again remnants of Te Aute limestone occur along the middle of the syncline. In the north this is a simple syncline eight miles wide, but in the south it is composite, with anticlinal axes trending north at Ti Tree Point and Mount Arthur. Its western margin also is not simple, but is broken by salients of sharply folded Cretaceous rocks jutting in from the west, and Cretaceous rocks, west of Weber, nearly surround a small north-north-east syncline of Tertiary strata.

The next Cretaceous anticline west of the Tertiary synclinorium is five miles wide, and has on its west another Tertiary syncline whose western limb is the conspicuous dip-slope forming the east side of the Puketoi Hills. On the west side of the Puketoi Hills the beds dip westward in extensive dip-slopes, showing that the range is anticlinal; but this part was not examined in detail. The beds are faulted or form a syncline between the Puketoi Hills and the Waewaepa Range, three miles to the west. In this range the greywacke core is exposed in a belt two and a half miles wide along the anticlinal axis, and the Tertiary beds continuously dip off the west limb for ten miles and pass under the alluvial plains of Pahiatua, which occupy the syncline. West of Pahiatua the beds rise to the west for three miles, then turn over in an anticline and dip westward for a mile, where they are cut off by the fault along the east of the Tararua Range. This fault dies out as the range descends northward, and the Tararuas are spanned by an asymmetrical arch of Tertiary beds.

Thus the strip of country on the northern edge of Eketahuna Subdivision, forty miles wide from east to west across the strike of the beds, contains nine anticlinal ridges, mostly of pre-Tertiary rocks, and nine synclinal valleys with floors and sides of Tertiary beds. The Tararua Range, on the west, is an asymmetrical anticline with a long gentle western limb and a steep short eastern limb, and has a greywacke core. The next anticline is broken along its west side. The next has a gentle west limb ten miles long and a steep east limb two miles long, and likewise in places has a greywacke core. This indicates that the beds were folded by pressure from the west. The other folds are symmetrical, strongly compressed in the synclines, and, as already mentioned, even to the coast the anticlines are bordered by vertical and overturned beds.