2. WAIROA SUBDIVISION.

(By M. Ongley.)

Wairoa Subdivision is an area of 1,600 square miles on the east coast of the North Island, between 38° 15′ and 39° 20′ south latitude, adjoining the Gisborne Subdivision, described in Geological Survey Bulletin No. 21, and extending away to the south and west. Along part of its eastern boundary it faces the ocean and on the south is Hawke Bay. It includes the country from the east coast to the Huiarau Range as well as a small area west of that watershed.

The rocks of which it is formed are all sedimentary, Jurassic, Cretaceous, and Tertiary in age and are continuous with those of the Gisborne and Waiapu subdivisions, and, like them, have been favourably reported on by authoritative oilfield geologists. Consequently the solution of the geology is desirable. Since 1926 a party has been working there during each field season, and the results obtained will be reported in a Geological Survey bulletin to be issued later.

Topography.

The subdivision contains part of the Huiarau Range, the main divide between streams flowing to the Bay of Plenty and those flowing to the east coast, but consists chiefly of dissected plateau country descending gradually from 3,500 ft. in the west to 500 ft. at the coast. It is deeply dissected by many mature consequent streams flowing south of east down the slope of the plateau, and by the large, mature, subsequent Wairoa River, flowing west of south in entrenched meanders through a drowned, infilled valley along the Wairoa Syncline. Many of the smaller streams, too, have adjusted parts of their courses along the strike of the beds. Seen from a distance, the country appears flat, but it is made up of series of mature ridges, and no flat remnants are anywhere preserved.

Structure.

The subdivision contains two different types of country: the older, hard greywacke and argillite folded into closed folds and standing vertical; the younger, sandstone and mudstone in fairly regular, extensive, open folds.

Just west of the subdivision in Wakamarama West Survey District, and also in the west of the subdivision in west Koranga, greywacke with carbonaceous remains, argillite, and greenish mudstone, standing nearly vertical, strike east of north and have many of the soft beds crushed, slickensided, and pugged. These facts show that they have been tightly folded about axes trending east of north, and that the stress was severe enough to crush some beds and push the beds along on the crush-planes. In south-east Moanui and north-east Koranga, too, similar beds strike the same. In Moanui the beds are strong greywacke and argillite, and they dip steeply eastward; in Koranga and north-west Ngatapa the beds are fairly soft mudstone, and they dip 25° westward. The strata thus form an asymmetrical synclinal eight miles wide trending east of north to north-east across Motu Survey District to Matawai. Whether the axial part is bent in a fold or broken by a fault is not known. Above the steep greywacke on the west flank and in places reaching to the middle of the synclinal and running parallel with it are strong rugged ridges of Taitai sandstone and conglomerate, shattered, jointed, and slickensided, and mostly without recognizable bedding. Specimens of *Inoceramus* and a few other fossils have been got from the beds on both limbs, and *Aucella* from the Taitai; if these can be zoned the structure may be nearer solution.

The age of the tight folding is evidently post-Jurassic and it is pre-Tertiary. The severely distorted Mangatu beds in the south-east of the subdivision show that the tight folding was active in places after Mangatu time (Cretaceous).

In contrast to the older rocks, the Tertiary beds were not intensely folded, and the only places where they are steep are alongside faults. Generally they form extensive gentle dip-slopes running miles along the strike and meeting in broad open folds. In the south they strike generally north, but in the north of the subdivision they curve round and strike east.

In the south-east of the subdivision the Tertiary beds are in fault contact with Cretaceous rocks. From there, on Portland Island and south Mahia, they dip west and south-west over more than half the peninsula. In north-east Mahia the beds dip north-west for four miles. On the west coast of the peninsula the beds dip outwards from a point three miles north of Long Point. This pattern of beds is shown on the map. It indicates an anticline trending south of east across Mahia.

On the north of Mahia the beds dip inwards for four miles from Table Cape and one mile from the isthmus, forming the Mahia Syncline.

On the north-west side of the Mahia Syncline they rise for ten miles into the Morere Anticline. This is a big fold, covering more than 100 square miles. It trends east of north from the Nuhaka River to the east coast, where the axis lies three-quarters of a mile north of Paritu Stream. On it are two bulges, a large one extending north across Nuhaka North into Patutahi Survey District and a smaller one extending three miles north in Paritu Survey District.

The west limb of the Morere Anticline dips west for three miles into the Nuhaka Syncline, which crosses the subdivision from Tahaenui, on Hawke Bay, to Te Arai, in Patutahi Survey District, in the north, and is constricted by a saddle which divides it into northern and southern parts. The west limb of this syncline, in turn, rises westward for four miles into the Mangapahi (Mangaone) Anticline, which is another structure more than 100 square miles in area. It trends north for fifteen miles in the west of Nuhaka North Survey District. West of this again the beds dip west for eleven miles into the Wairoa Syncline, which was mapped trending north for thirty miles, inland almost to Hangaroa Village site. It has several small puckers in it, and at the south end broadens out and, branching, swings away to the south-west and south-east.