

EKETAHUNA SUBDIVISION.

(By M. ONGLEY and H. E. FYFE.)

The Eketahuna Subdivision, which extends forty-five miles along the east coast of the North Island from Cape Turnagain to Castle Point and reaches inland fifty miles to include part of the Tararua Range, like other parts of the east coast, has in it rocks smelling of oil and springs yielding hydrocarbon gas. Several wells have been sunk in attempts to get oil and have failed, and it is accordingly desirable that any further drilling should be preceded by geological examination to see if any more evidence can be obtained. If holes are drilled haphazard and fail, nothing is proved; but if the favourable parts can be located and tested, then the field will have had a fair trial.

As was shown in last year's report, the grain of the country runs north-east, parallel with the coast on the east and the mountains on the west, and it was stated that the northern part of the subdivision, forty miles wide from east to west across the strike, contains nine anticlinal ridges, mostly of pre-Tertiary rocks, alternating with nine synclinal valleys floored with Tertiary. This year some corrections must be made and some new data added.

The Puketoi Range, last year described as an anticline, is found to be a cuesta formed by the strong limestone on a westward-dipping homocline. Again last year it was reported that the beds between the Puketoi and Waewaepa ranges were synclinal or faulted; it is now evident that they are faulted and the west block is upthrown 2,000 ft., bringing up the greywacke in the Waewaepa Range.

About 600 square miles of country south of the area covered last season was mapped, and the structure and rock-formations were found to be similar—that is, the district consists of anticlinal ridges of Cretaceous rocks and synclinal basins filled with Tertiary rocks, trending east of north. The most easterly syncline, with its axis at Cape Turnagain, runs out to the coast near Herbertville, and south of that the ridge of Cretaceous rocks occupies the coast for at least twenty miles. This ridge is simple in the north, but south of the Waimata Stream, across the Akitio and Aohanga, and as far south as was examined—that is, for fifteen miles—it has a core of greywacke two to three miles wide, flanked on both sides by the Cretaceous hard shaly mudstone. The ridge is eight miles wide. Inland of it is the southern extension of the Te Awa Putahi syncline, also eight miles wide and filled with Tertiary beds. This is simple in the north, composite near Weber, containing anticlinal corrugations, and farther south simple again. The next Cretaceous range to the west plunges to the south. At Pongaroa it is four miles wide, and south of that the Tertiary beds close in and completely cover it. West of that is the westward-dipping homocline of which the crest forms the Puketoi Range. At the western foot of these is the big fault with 2,000 ft. throw that brings up the greywacke in the Waewaepa Range. From there to the Tararua Range, twenty-one miles away, is a broad synclinorium with a small anticlinal fold on each limb, and in the south-west two small greywacke ridges cropping out. East of the Tararua Range runs another big fault, along which the greywacke of the mountains is upthrown.

The structure can be summarized as four main structural "highs" forming ridges of old rock trending east of north, and four corresponding synclines of Tertiary beds, in places composite or corrugated with minor folds.

GEOLOGY.

The area mapped last season contains the same geological formations as that before examined, and a little more evidence about them has been gathered. In the previous report the greywacke rocks of the Tararua and Waewaepa ranges were classed as pre-Cretaceous (non-fossiliferous). This season in the Waewaepa Range we found *Aucella*, indicating an Upper Jurassic age. In the same range we found blocks of feldspar-porphry and amygdaloidal basalt. The presence of the basalt suggests that the greywacke, though mapped as one formation, may consist of two. South of Eketahuna, also, the greywacke has in it tuff and vesicular basalt, together with interbedded marble containing the same *Aucella* as that found in the Waewaepa Range; no fossil has been found in the greywacke of the Tararua Range or that at Akitio and Aohanga.

The Cretaceous beds have yielded a few specimens of *Inoceramus*, *Belemnites*, a *Pecten*, and a *Lima-tula*, and probably contain Turonian and Senonian beds.

In several places the Tutamoe (Miocene) beds rest directly on the Cretaceous and contain conglomerate of pebbles of Cretaceous chocolate-coloured mudstone. Along the west of the Waewaepa Range, Te Aute (Pliocene) beds rest directly on the greywacke. Evidently there are major unconformities before the Tutamoe and before the Te Aute beds were deposited.

The Te Aute formation contains 2,000 ft. of beds, including three pebbly shallow-water limestones.

ECONOMIC GEOLOGY.

The most important economic work has, of course, been the geologic studying and mapping of the subdivision. Incidentally we have mapped areas of limestone (suitable for various uses), greywacke (suitable for roads, concrete, &c.), a small area of marble, and several small areas of pumice sand.

We inspected several reported coal-seams and found them valueless. We sampled several springs of natural gas, most of which contain 8 per cent. or less of ethane, but one has the following composition:—

Carbon dioxide	..	..	..	..	..	0.4
Oxygen	..	..	..	..	..	0.8
Unsaturated hydrocarbons	..	..	..	..	..	3.2
Methane	..	..	..	..	..	63.0
Ethane	..	..	..	..	..	31.5
Nitrogen	..	..	..	..	..	1.1
						100.0