

6. UPPER URENUI VALLEY, ETC., TARANAKI.

(Summary of report by P. G. MORGAN.)

At the end of December, 1925, and again in March, 1926, I visited various localities in Taranaki, chiefly in order to form an opinion concerning the validity of an anticlinal structure in the upper part of the Urenui Valley which Taranaki Oilfields (Limited) was considering as a possible source of oil.

The greater part of the Upper Urenui Valley was examined by Mr. E. de C. Clarke about 1910, as part of the survey of the New Plymouth Subdivision. The results of Mr. Clarke's work were published as N.Z. Geol. Surv. Bull. No. 14; 1912. In late years that part of the Urenui Valley which is in Upper Waitara Survey District has been geologically surveyed by Mr. L. I. Grange as part of the Tongaporutu-Ohura Subdivision, and a detailed report dealing with that subdivision has been prepared, but is not yet published.

Westerly dips of the strata are the rule throughout the Urenui Valley and adjoining areas, but from near Ōkoke south-south-westward to near the head of the Urenui many easterly dips exist, mostly on the east side of the Urenui Valley. A few of these were mapped by Mr. Clarke and Mr. Grange, and the remainder were found by the geologists attached to Taranaki Oilfields. On the whole the dips indicate a gentle anticline, with a domal portion near the middle part of its known course.

The suggestion has been made, however, that the easterly dips were due solely to current-bedding, not to tectonic movement, and therefore that the Upper Urenui "anticline" was a pseudo-structure. In the Lower Pliocene and Miocene strata of Taranaki current-bedding is widespread, and not less so in the Urenui Valley than elsewhere. Some of the observations of easterly dips, as well as dips in other directions, are vitiated or rendered very dubious by current-bedding, and in one or two cases by probable slumping during consolidation. I cannot, however, hold with the hypothesis that over the greater part of Taranaki the Tertiary strata dip only in directions with a westerly component, and that practically no easterly or "reverse" dips are to be found. In order that this hypothesis should hold good the current-bedding would have to be on a gigantic and hitherto unheard-of scale. In order definitely to prove or disprove it a large amount of highly detailed field-work is needed. In the meantime I regard the structure of the Tertiary strata in the Upper Urenui Valley as truly anticlinal.

At the east end of the second road-tunnel on Whangamomona Road, some miles south-east of Whangamomona, thinly-bedded fine-grained sandstone and sandy claystone, dipping eastward at fully 20°, rest upon nearly horizontal beds of brown sandstone. The separating surface was formed by erosion, and, except for small irregularities, is parallel to the upper beds. The dip of the upper beds can be explained reasonably only by current-bedding. The occurrence as a whole may be regarded as a good example of what is termed contemporaneous erosion, or it may be a case of unconformity—a peculiar one, such as that noted in the fifth paragraph on page 44 of N.Z. Geol. Surv. Bull. No. 24.

Two miles or less south-east of the locality just mentioned nearly horizontal strata form the lower few feet of a high steep road-cutting. Above, at the east end, beds of sandstone, wedging out westward, dip at 8° or more to the west, while at the west end the upper beds dip eastward. A view from a little distance thus gives a deceptive appearance of a syncline, whereas a close view suggests an infilled channel. Some of the lower beds on the west side seem to be cut off by erosion. The inclined upper beds perhaps represent foreset beds in a delta formed by the "spilling-over" of the material from two different points.

On the coast-line north of Pukearuhe, just to the south of Waikaramarama Creek, the sea-cliffs show very fine current-bedding (in Urenui beds). This, however, is of normal type, indicating shallow-water conditions during deposition. Northward the strata (mainly sandstone) exposed in the cliffs show here and there a rather mild current-bedding, which causes small variations in the dip of the beds, here on an average about 5° to the south-west. A mile to the north of Waikaramarama Creek a persistent nearly horizontal surface represented by a line in the cliffs separates two sets of beds dipping at slightly different angles. This surface seems to indicate true unconformity rather than contemporaneous erosion, and according to Mr. L. I. Grange it separates Urenui beds (above) from Tongaporutu beds (below).

7. AURIFEROUS DRIFTS, ST. BATHANS, CENTRAL OTAGO.

(Report by P. G. MORGAN, slightly abridged.)

In February, and again in April, 1919, I made visits to St. Bathans, Central Otago. Only brief reports on these visits were supplied, but some geological data will be found in a paper by me, "The Tertiary Beds of Central Otago" (*N.Z. Journal of Science and Technology*, vol. 3, No. 1, pp. 29-33, 1920); in A. McKay's "Report on the Older Auriferous Drifts of Central Otago" (Parliamentary Paper C.-4, 1894; second edition 1897); and in other publications listed in my 1920 paper.

On the 13th and 14th April, 1926, I again visited St. Bathans and made some further observations in this interesting locality. Much work remains to be done before a detailed geological report can be written. The preparation of such a report involves the examination of many localities distant from St. Bathans where Tertiary quartz-drifts occur; it also involves a large amount of research. Several baffling and difficult problems must, if possible, be solved.

The gold-workings at St. Bathans are in a thick series of quartzose gravels, grits, and sands, interbedded to some extent with lignite and brown (carbonaceous) and light-coloured clays, overlain by a thick stratum of greenish fossiliferous clay of fresh-water origin. The quartz drifts are also of fresh-water origin: they appear to have been formed on or near the shore of an ancient lake, the water-level of which was slowly rising. Ultimately in the St. Bathans locality the lake became deep, and muds were deposited above the gravels and sands. These beds at St. Bathans strike between north-west and north. Their dip is generally about 45° to the south-west, but in places is nearly vertical; in places a good deal less. According to a rough estimate the thickness of the quartz drifts and associated beds exceeds 500 ft.; the overlying clays are at least 400 ft. thick.