5. PALÆONTOLOGICAL REPORT.

(By Dr. J. Marwick.)

During the past year considerable time was spent in putting through the press Palæontological Bulletin No. 13, which deals with the Tertiary mollusca of the Gisborne district.

In co-operation with Dr. H. J. Finlay, of Dunedin, a start was made on the description of the Wangaloa fauna of Kaitangata and Boulder Hill, Dunedin. This work indicates that the fauna from the Castle Hill shaft, Kaitangata, previously regarded as equivalent in age to the Wangaloan, is considerably younger, and is best classed in the Bortonian (Eocene). The Wangaloa fauna contains so many Cretaceous elements and has so little in common with the known Eocene fauna that it is best regarded as uppermost Cretaceous.

Work was continued on the Cretaceous and Tertiary fossils of the Dargaville-Rodney and Motueka Subdivisions, and also on the Triassic of Kaitangata Subdivision.

In September, 1930, through the kindness of the late S. J. H. Sylvester, a week's visit was paid to Castle Hill, Trelissick Basin. The time was somewhat limited, but fossil collections made with Mr. M. Ongley's assistance will help materially towards the understanding of the geological history of North Canterbury.

Two and a half months, from March to May, were spent in the Waiau district with Mr. Fyfe's party. Geological mapping occupied most of this period.

6. OKOROIRE HOT SPRINGS.

(By J. Henderson.)

The Okoroire Hot Springs are on the east bank of the Waihou River at a point about three miles south of east from Okoroire Railway-station. There are several springs, of which the chief are numbered No. 2 and No. 4. The latter is the larger and rises at river-level through the sand forming the bottom of a swimming-bath. This pool has a temperature of about blood-heat, and its discharge amounts to about 750 gallons per minute. Gas rises in small amount with the water, and a sample the writer collected was found by the Dominion Analyst to contain gases in the following percentages: Nitrogen, 82·7; oxygen, 0·1; carbon dioxide, 9·4; methane, 6·2; and ethane, 1·6.

The spring feeding No. 2 bath is decidedly smaller, the discharge from the pool being but 10 gallons per minute. Its temperature, according to Dr. Herbert ("Hot Springs of New Zealand," p. 134; 1921), is 113° Fahr.

The water from No. 2 Spring escapes from a cleft in a somewhat altered fine-grained rhyolite tuff at a point about a chain from, and 10 ft. to 15 ft. above, the vent of No. 4 Spring. This rhyolite tuff, which closely resembles the vitric tuff of Arapuni, extends up the bed of the Waihou for some 5 chains and down-stream for an unknown distance, the river forming a series of narrow gorges in the resistant rock and tumbling in picturesque cascades. Above the outcrops of tuff the stream flows at grade in a relatively narrow valley entrenched about 70 ft. in the loose pumiceous sands and silts of an extensive fluviatile plain which stretches north to Matamata, and is in fact part of the southern end of the Hauraki Plains. In this locality, south-west toward Tirau, and north-west past Hinuera Railway-station, the alluvium of the plain surrounds the low hills of an old land surface it has partly buried, and extends for miles along wide valleys between rolling downs. Probably the Waikato formed the Matamata flats when it flowed through the Hinuera valley (L. Cussen, Trans. N.Z. Inst., Vol. 21, p. 409; 1889). The writer (N.Z. Jour. Sci. & Tech., Vol. 1, p. 59; 1918) pointed out that the Waikato had built an extensive flood-plain from Arapuni eight miles down-stream to Pairere, where the river makes a right-angled turn to the left, away from the Hinuera valley, of which the wide floor directly continues the flood-plain. It should be noted that the heights above sea-level given in the paper cited are all about 50 ft. too high, and that the floor of the Hinuera valley where it leaves the Waikato is about 300 ft., and not 350 ft. as stated. This point is thus 90 ft. higher than Matamata (211 ft.), from which it is distant, down the Hinuera valley and across the Matamata plain, about ten miles. The writer has traversed more than half of the intervening flats, which by report continue without change or terrace step throughout the whole distance. The grade from Matamata to the head of the Hinuera valley works out at 9 ft. per mile, the same as the grade of the plain from Matamata to Waharoa about four miles to the north. The evidence that the Waikato flowed through the Hinuera valley and built the Matamata flats before its course was diverted past Cambridge and Hamilton is very strong.

7. COAL NEAR WAIMANA, WHAKATANE COUNTY.

(By J. Henderson.)

The steep broken hills of the Urewera country surround an area of river-flats and rolling downs at Waimana, a village on the Opotiki Road seven miles south-east from Taneatua. These hills of strongly folded greywacke and argillite, closely resembling strata of the Tararua and Ruahine ranges, rise in crests and narrow steep ridges from 900 ft. to 1,200 ft. above the sea. The evenness of the sky-line from a distant aspect suggests that the hills have been carved from an uplifted peneplain, and the straightness and steepness of the eastern edge of the hills from Whakatane to beyond Taneatua suggests a fault-scarp. The fracture-planes in the rocks of the cliffs at Whakatane and along the gorge of the Waimana up from Taneatua support the latter supposition.