

At a point some two miles north-east of Te Kuiti, on the Mangarino Road, there is unconformity between Mokau beds and a calcareous mudstone referred to the Te Kuiti Series. Overlap occurs about a mile south of Tahaia, a small village in the south-east of Mangaorongo Survey District, some thirteen miles east-north-east from Te Kuiti.

Where the Mahoenui is the underlying series, the basal Mokau bed in places is a fossiliferous conglomerate about 5 ft. thick, containing greywacke pebbles up to $1\frac{1}{2}$ in. in diameter, and waterworn sandstone fragments, though in some localities this bed gives place to a gritty or sandy limestone or shell-bed. The overlying fine-grained massive sandstone is correlated with the lower Mokau beds of the adjoining Tongaporutu Subdivision. Except in the south-west corner of Totoro Survey District, where thin seams of coal occur, the overlying coal-measures and upper sandstone beds have been denuded.

Mohakatino Series.—Beds of this age form a few outliers to the south of the Mokau River, but the main development of the series occurs on the coastal section south from Ngukuhakare Bay, where calcareous mudstone and sandstone, containing a great deal of disseminated volcanic ash and numerous tuff bands, form the surface of a downfaulted block. Only to the south-east is there an overlapping contact with the basement Mesozoic rocks, against which the Mohakatino beds are elsewhere faulted. Southward the series extends into the Mokau Subdivision, where it overlies Mokau beds with angular unconformity. The tuff appears to increase in coarseness and amount towards Whareorino, which is most probably the source of this material in the Mohakatino beds. Current-bedding is frequent in the sandstones.

IGNEOUS ROCKS.

Serpentine.—On the Rangikotuna Road, a mile south-south-east of the Wairere bridge across the Mokau River, serpentine of a greenish mottled colour, much shattered, is exposed for a couple of chains.

Basalt.—Basaltic rocks occur in the extreme north of Orahiri Survey District, being the southern edge of the material ejected from Mount Pirongia, a peak in the adjoining Huntly-Kawhia Subdivision. Twelve miles farther east is a small patch of fine grained dark-greyish basaltic lava.

Andesite.—In Whareorino Survey District two andesite peaks, Pehimatea and Whareorino, break through the Mesozoic beds. Neither has any sign of a crater, and the appearance of Whareorino suggests that it is a plug laid bare by denudation. The andesite, which strongly resembles that from Orangiwhao, near Kawhia, is light-coloured and contains feldspar phenocrysts up to $\frac{1}{4}$ in. and hornblende aggregates an inch or more across. It occurs as dykes near Moeatoa Trig. and on the south side of the saddle between Waikawau and Kiritehere, where it is intruded in *Pseudomonotis* beds standing vertically.

Rhyolite.—Much of the eastern portion of the subdivision is covered with rhyolitic tuffs and breccias, in places several hundred feet thick, ranging from fine and unconsolidated sands to hard, coarse, and compact rock. Generally the tuffs have been laid down subaerially, but some are undoubtedly subaqueous. No evidence indicating a local origin for the tuff was found.

Ash Showers.—The district has at one time been covered by pumiceous or andesitic ash showers, which have been removed by denudation in some parts, but in others have weathered down to form the soil. These showers and their effect on the productivity of the district form the subject-matter of a special investigation by the Soils Branch of the Department.

ECONOMIC GEOLOGY.

Coal.—Coal occurs in the Mokau beds in the Aria district, south of Piopio, and in the upper Mangapehi valley, where a 10 ft. seam has lately been found. Seams of workable thickness below the Te Kuiti Limestone are known in the Otewa district north-east of Te Kuiti, in the Awaroa valley south-east from Kawhia Harbour, and at several points on the western uplands.

Limestone and Clay.—High-grade limestone, and clay suitable for brick and tile manufacture, are to be found in the district. The limestone is largely pulverized for agricultural lime, but so far no use is made of the clays.

Iron-ore.—Iron-ore occurs as grains of magnetite and ilmenite in the beach and dune sands of the western coast, and also as a compact deposit capping a hill of Mesozoic rock at Harihari, some seven miles north of Marakopa.

SOIL SURVEYS OF NORTH ISLAND VOLCANIC AREAS.

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INTRODUCTION.

In the 1931-32 field season the writers made soil surveys for the Department of Native Affairs of a considerable area of Native lands in the Rotorua, Bay of Plenty, and Urewera districts. In all, thirteen blocks which are to be roaded and subdivided for settlement were mapped in detail. For the Department of Lands and Survey, reports were prepared on Galatea Estate and on the Waihaha-Tihoi-Poukani-Tirohanga Block, lying west of Lake Taupo. Laboratory work in connection with these surveys was done at Cawthron Institute under the direction of Mr. T. Rigg, director of Central North Island Reconnaissance Soil Survey, and at the Dominion Laboratory by Mr. F. T. Seelye.