

argillite, in places streaked with thin laminæ of light sandstone, striking south-east continuously for a mile along the stream and dipping south-west at 30° . The argillite is overlain evenly by a flaggy sandstone 3 ft. thick, the lowest 3 in. of which is closely packed with subround and subangular pebbles of mudstone $\frac{1}{2}$ in. through, and many shells of *Aucella* set in a coarse sandy matrix. The contact is straight, even, smooth, and parallel to the bedding. Above the pebbly part the sandstone contains laminæ black with carbonized wood, and in places there are three or four black laminæ interbedded with fossiliferous sandstone beds 1 in. thick.

Down-stream, evidently above the contact, is dark argillite which, higher in the sequence, becomes more arenaceous, and rises a mile down-stream, at the gorge, into hard, massive, coarse greywacke. On the right bank of Koranga Stream, below the junction, the argillite underlies the greywacke, above which is the pebbly greensandstone. The bed last mentioned forms the extensive gentle dip-slopes between the Koranga and the Moanui. In the stream above the gorge the greywacke is steep, and it continues steep for half a mile to the north along the strike.

Mangatu Series.—In the south-east of the subdivision at two places on the east coast of Mahia Peninsula, and also in Kopuawhara Valley at the north of Mahanga Survey District, argillaceous limestone, light-coloured mudstone with fucoids, and greensandstone occupy small areas where they are faulted against Tertiary strata. From lithology they are correlated with the Mangatu (Upper Cretaceous) beds of Waiapu and Gisborne subdivisions. At the biggest outcrop they extend for 50 chains along the beach, dipping 60° – 70° , and are evidently 3,000 ft. thick. They crop out, striking in a semicircle with an overturned fold in the centre, both limbs dipping south at 80° . From the coast an anticline strikes north-west towards the gas and brine springs a mile inland. Both limbs are steep, one dipping north at 60° the other south at 80° .

In Motu Survey District dark argillite, greensandstone, and light mudstone occupy the middle of the west end of the Waikohu Anticline. These probably belong to the Mangatu Series, but fossils are wanting. The similar Mangatu (?) beds in Anini Stream have already been mentioned. In west Ngatapa and east Koranga a large area is occupied by similar beds. Dark-brown mudstone, bluish-grey mudstone, and greensandstone, striking east of north, dip continuously westward at 26° – 30° for five miles along Koranga Stream, exposing 6,000 ft. of strata. The beds of greensandstone form extensive dip-slopes over more than 20 square miles. The mudstone and concretionary beds contain *Inoceramus* and fragments of *Belemnites*, but no definite age can be given to them. They are not indurated, and on lithology are tentatively placed in the Mangatu Series.

Their stratigraphic relation to the argillite that underlies the *Aucella* bed is not clear. They may be the same beds, but on lithology they appear younger and have accordingly been regarded as part of the Mangatu Series.

Wheao Series.—So much of the district is unfossiliferous that it is impossible to be sure what beds are present in certain places, and this applies especially to the low Tertiary strata, in which the shallow-water beds differ much from place to place. Still, there is no difficulty about superposition and the beds remain similar for distances sufficient to enable the geology to be worked out fairly satisfactorily.

Continuous with the Wheao Series of the type locality described in Bulletin No. 21, beds of alternating sandstone and mudstone extend up Waikohu River in the north-east of the subdivision, occupying the middle of the Waikohu Anticline. Near the base occur beds of shelly limestone and pebbly greensandstone, and above them beds of alternating sandstone and mudstone. It is difficult to say where this series ends, for the igneous conglomerate characteristic of the base of the overlying series is not present. By projecting the boundary from the igneous conglomerate in the Gisborne Subdivision along the strike of the rocks the Wheao Series appears to be two miles wide, and, since the beds dip at 25° , the formation is estimated as 4,500 ft. thick.

Ihungia Series.—There are no beds in the subdivision like the Ihungia Series of the type locality in Waiapu Subdivision, but two miles to the east the basal Ihungia conglomerate is known, although it does not persist into the subdivision. The approximate Wheao-Ihungia contact, drawn as stated in the preceding section, places the base of the Ihungia Series in Motu Survey District out on the flanks of the Waikohu Anticline, two miles from the axis; and there strong sandstone beds form extensive dip-slopes at Trig. Pc in the north and at Trig. 137 in the south. On the south limb of the anticline this ridge-making sandstone crosses Waikohu River three-quarters of a mile east of Kokupara Stream. There it contains lenses of coal $\frac{1}{2}$ in. thick and pebbles of mudstone. The basal sandstone is 60 ft. thick, and the sandstone beds aggregate 200 ft. Above these follow thin beds of alternating sandstone and mudstone, 1 in. thick, strikingly evenly bedded and uniform over large areas in the Waihuka and upper Waikohu valleys.

In the south of the subdivision the beds classed as Ihungia on palæontology are different; but, since they occur below a conglomerate containing the fauna of the overlying Tutamoe Series, they are placed in the Ihungia Series. They crop out conspicuously near Waikokopu, for two miles along the coast of Paritu Survey District, and in Tunanui Stream, in Nuhaka North Survey District, as thick beds of coarse concretionary sandstone. Many of the beds consist almost wholly of concretions 4 ft. to 6 ft. through. The sandstone contains a great deal of broken shell. Between the beds of sandstone lie thin layers of dark mudstone, in places so black with carbonaceous material as to be locally reported as coal. Many of the mudstone beds are eroded and formed into edgewise conglomerate. Along the coast these beds are 3,500 ft. thick, and the base is not exposed.

Tutamoe Series.—A conglomerate containing the characteristic Tutamoe fauna crops out in several places in the east of the subdivision; and above it lies a series of thick beds of coarse concretionary shelly sandstone just like the underlying beds. Higher in the sequence the sandstone is finer, and the beds of sandstone thinner, the intervening mudstone beds thicker, and the series grades up into the massive Morere mudstone, which crops out in many places with the same characteristics, and so affords a useful horizon-marker. The lower part of the series is 4,500 ft. thick, and the Morere mudstone 1,000 ft.