

SPECIAL REPORTS.

I. MOTUEKA SUBDIVISION.

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Introduction.

THE second season's field-work in the Motueka Subdivision was begun on the 4th November, 1924, and ended on the 23rd May, 1925. Parts of the survey districts of Harapaki, Flora, Leslie, Matawai, Mount Arthur, Motueka, Tasman, Wangapeka, Wai-iti, and Tadmor were geologically surveyed. In all about 367 square miles was examined in detail.

During the greater part of the season work was confined to the uninhabited mountainous western half of the subdivision, where access is by poorly graded and, for the most part, ill-kept pack-tracks, and by trails blazed by hunters and old-time miners.

The highland area contains deposits of commercial value in the chrysotile-bearing serpentine and talc of the upper valley of the Takaka and in the extensive beds of marble traversing the subdivision. The gold-bearing gravels that formerly attracted many diggers are now no longer worked, and the auriferous quartz veins of the area up to the present have not been profitably mined.

Forests cover the greater part of the mountains, but on their eastern side the lower slopes and the valley-bottoms are largely cleared and used as pasture-ground for sheep and cattle. The extensive fellfields of the higher mountains are also grazed during the summer months. The eastern half of the district is now for the most part denuded of forest. The hilly portion is covered with a thin, meagre soil which supports a scanty herbage. Orchards and pine plantations occupy small areas. The fertile valley-bottoms and delta-plains are closely settled. Root crops and cereals are extensively grown; there are numerous orchards, and toward the mountains, where the rainfall is heavier, dairying is carried on.

Physiography and Structure.

The Motueka Subdivision consists of a wide lowland structurally depressed between the mountains of west Nelson and the northern continuation of the main Alpine chain of the South Island, here without a definite name, but farther south known as the St. Arnaud and Spenser ranges. Great fracture-zones edge the depression—that on the east, McKay's Waimea fault, striking about north-east, and that on the west, the Motueka fault of the same geologist, trending, on the whole, north-north-east.

After all or most of the great earth-movements that roughed out the present land forms had ceased, the depression was covered with river-gravels, which formed a vast deposit sloping in a general northerly direction to Tasman Bay. These gravels are now much dissected. The wide terraces of the principal streams and the extensive delta plains at their mouths suggest considerable oscillation of the land since the deposition of the gravels.

Great fractures, of which the more important strike north-east and north-north-east, traverse the western highlands and separate the differentially elevated blocks that form their mass. These fractures and the tilts and warps of the individual earth-blocks more or less control the position of the stream-channels and the extent of the drainage-basins.

The Motueka, the chief river of the subdivision, rises in the eastern mountains, crosses the lowlands obliquely, and flows along their western edge to Tasman Bay.

No permanent snowfields occur, but some valleys were anciently glaciated as low as 2,500 ft., and many at higher levels.

General Geology.

The western highlands consist of a vast thickness of older Palæozoic rocks strongly folded along north and south lines, and intruded at many points by acidic, basic, and ultrabasic rocks. Tertiary strata occur in the mountains along fault-angles and flooring depressions, and extend in an irregular strip along the western edge of the lowlands from the southern boundary of the subdivision north nearly to the junction of the Tadmor and Motueka rivers.

The oldest rocks of the subdivision are chiefly indurated argillites, greywackes, and quartzose greywackes, assigned to the Aorere Series. In their upper portion thick bands of quartzite, interbedded with thin bands of black carbonaceous shale, in many localities altered to slate, occur. At some points lenses of marble are present in the carbonaceous shales. In many places the finer-grained sediments are schistose, as are also the greywackes toward the base of the series or near granitic intrusions. The rocks form a broad belt extending meridionally through the western part of the district, where they are intruded by vast granitic batholiths. Graptolites occur in the carbonaceous shales of the upper part of the series.

The Aorere greywackes pass upward into grits, conglomerates, and breccia conglomerate, which form the typical rocks of the Haupiri Series of Bell, Webb, and Clarke (Parapara Subdivision). Thick beds of quartzite and phyllite, in places containing lenses of impure marble, also occur, as well as green schists, probably altered igneous rocks. The coarser beds, which in some places are many thousands of feet thick, are throughout interbedded with greywacke, and grade laterally into greywacke and quartzite. The Haupiri rocks form a broad band extending north and south through the district immediately east of the Aorere rocks, and, like them, have a general dip to the east.