

Preliminary Note on the Occurrence of an Ultrabasic Intrusion in the Livingstone Range, Western Otago

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DURING the summer of 1935–36 the writer verified the previously reported existence of an extensive ultrabasic intrusion in the region lying west and south-west of Lake Wakatipu, Western Otago. The only earlier published reference to the occurrence of basic or ultrabasic igneous rocks in this district is that contained in Cox's Te Anau report (1878, pp. 111–112), where he states that dykes of syenite occur in the Eglinton River, higher up than Mount Eglinton, and veins of black serpentine are present in Windley and Coal Hill. Information as to the existence of the intrusive mass was supplied by Mr George Reid, of Glenorchy, Lake Wakatipu, to Professor James Park, who advised the writer to investigate it in detail. Corroborative information was also given by Mr B. Murrell, of Lake Manapouri.

The intrusive mass is sill-like in form and extends in an approximately straight line, striking nearly north and south, from the West Dome near Mossburn to a point just south of Cascade Creek, a tributary of the West Eglinton River, some 52 miles distant. The outcrop of the igneous mass is continuous except where it is buried by thick alluvial deposits laid down by the Oreti, Mararoa and Windley Rivers. It varies in width from approximately two miles near the Mavora Lakes to approximately five miles at the West Dome. From the Mararoa River to the north the intrusion makes up much of the craggy Livingstone Mountains and outcrops continuously along the summit of that range with the exception of the highest peak, Moffat Peak (6840ft.). To the south of the Mararoa River, however, the igneous rocks do not form high country except near their southern termination, where they end abruptly in the isolated West Dome approximately 5000ft. high. Along most of its length, the mass is bounded by greywackes of the Te Anau Series and their slightly metamorphosed equivalents. The actual contacts on both sides are marked by zones of intense shearing, along which fault breccias have been developed.

The rock-types present and their mutual relationships are very varied. In the northern portion of the mass dark-green mesh-serpentine appear to predominate, but are intimately associated with dark gabbroidal rocks. Further south, and particularly near the southern extremity of the intrusion serpentine are less abundant than rather feldspathic altered basic rocks (gabbros, dolerites, etc.). Vein-rocks are frequent. In one locality veins of dark-green serpentine with a white weathered surface were observed to cut gabbros, while coarse pyroxenites traversed both massive serpentine and

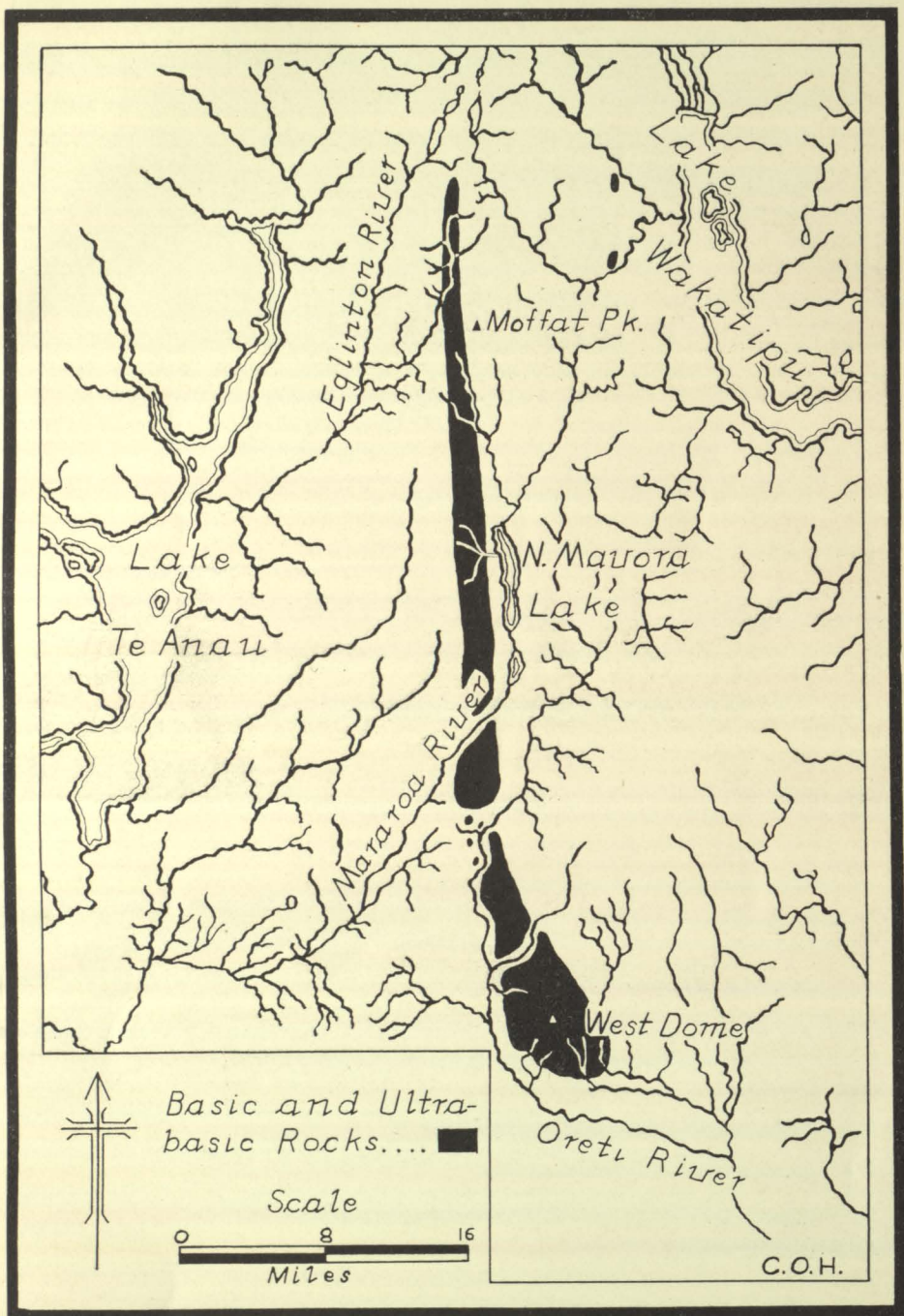
gabbros. Other vein-rocks recorded include bands of talc-schist, prehnite-pyroxene-rock, grossularite-bearing dykes related to rodingite, nephrites, honey-yellow fibrous serpentines and "hornblendites." Associated with the intrusion is a group of rocks with basaltic or doleritic affinities, petrographically distinct from any of those mentioned above; one type not yet closely studied appears to be comparable with the variolites (cf. W. N. Benson, 1914, pp. 147-149).

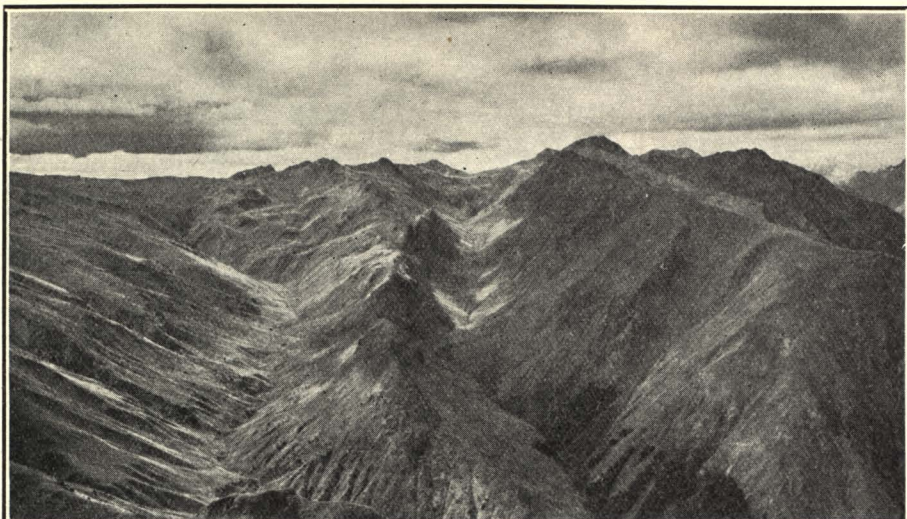
Finally, a cursory microscopic examination of a few of the rocks has been sufficient to indicate that they are in many respects petrographically similar to other basic and ultrabasic masses in Western Otago and South Westland (C. O. Hutton, 1936; F. J. Turner, 1933). In particular, metamorphic development of rocks such as talc-schist, nephrite and saussuritised gabbro is widespread.

A detailed petrological study of these rocks is now in progress.

LITERATURE CITED.

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Upper.—Looking north along the ultrabasic outcrop from a peak near the head of the North Mavora Lake.

Middle.—View showing the Mararoa River cutting across the intrusive mass outcropping in the foreground and the left distance.

Lower.—Outcrop of ultrabasic rocks on Mount Cerberus (5800ft.), a peak forming the southern termination of the Livingstone Range.