

*On a discovery of "Oriental Ruby" and "Margarite" in the Province of Westland, New Zealand.*

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IN the early part of this year Mr. W. Goodlet, laboratory assistant to Prof. Black, of the Dunedin University, submitted to me for examination a mineral specimen which he had brought from a journey of inspection of the gold fields of the West Coast, Middle Island. It had, so he told me, been broken from a boulder, about 40 lbs. in weight, which was found in the gold drift of a claim at Back Creek near Rimu, Westland, and placed aside by the claim owners as something uncommon, because of its weight and colour. The specimen was seen to be composed of a crystallised red mineral and a massive one of green colour, and the former I easily recognised by its hardness, crystalline form and pleochroism as ruby. Acting upon this information Mr. Goodlet was fortunate enough to secure from the claim owners several other small fragments of the boulder, and from a further examination of these I found the following:—

The ruby crystals appear throughout in slightly barrel-shaped hexagonal prisms with the basal planes, and on a few could be discerned minute triangular replacements of alternate basal corners, *i.e.* planes of a rhombohedron as noticed on rubies of other localities. The prisms are closely striated horizontally, and range in length from 2 up to 6 mm., and in thickness from less than 1 mm. to rarely 2 mm. and slightly over. The colour of some is a fine rose-red, approaching carmine, but most are of a deep purple-red and rather dull, the larger ones generally showing dark, dull terminations with clearer portions of brighter red intermediate. Perfectly clear and finely coloured grains can, however, easily be picked out for proving the characteristic strong pleochroism of the ruby. Whilst in some of the fragments the crystals are scarce, or in but moderate

abundance mixed with or embedded in the green mineral, in others they are so densely aggregated and intergrown as to produce a veritable ruby rock, with the green mineral appearing only in scattered small patches. There are, however, also pieces which consist only of the green mineral. At several places in one fragment there are seen in the latter between the rubies small bunches of minute acicular radiating crystals of a dark brownish green colour which may be either tourmaline or epidote, though more likely the former, judging from the rather triangular outline in cross section of some of the needles.

Regarding the green mineral, its colour varies between light and dark emerald green, and, though principally quite massive, there are seen in all the specimens lighter coloured portions which are fine-sealy and have a pronounced pearly lustre. As in a number of localities in North America and Asia Minor, margarite occurs associated with corundum, the idea lay near that, notwithstanding its green colour, the mineral under notice might also belong to this species. At my suggestion, therefore, Mr. P. Marshall, B.A., B.Sc., kindly made a quantitative analysis of a massive piece of a medium shade of green colour, which gave the following results:—

SiO <sub>2</sub>	...	...	...	...	35·83
Al <sub>2</sub> O <sub>3</sub>	...	...	...	...	45·96
Fe <sub>2</sub> O <sub>3</sub>	...	...	...	...	1·29
Cr <sub>2</sub> O <sub>3</sub>	...	...	...	...	0·02
CaO	...	...	...	...	10·09
MgO	...	...	...	...	0·93
K <sub>2</sub> O	...	...	...	...	0·39
Na <sub>2</sub> O	...	...	...	..	4·74
H <sub>2</sub> O	...	...	...	...	2·85
					102·10

Although summing up rather unsatisfactorily, these results, on comparison with those of a number of analyses of margarite recorded in the mineralogies of Dana and Hintze, may be regarded as sufficiently close to place the New Zealand associate of corundum also under the lime-micas or margarites, as surmised. Its green colour is doubtless due to the sesquioxide of chromium, and the varying shades depend upon the amounts of the latter entering into the composition. Small as the trace shown in the analysis is, it proved quite sufficient to impart a green colour

<sup>1</sup> Separately determined by Mr. H. Walcott.

to the borax bead on some of the powdered mineral being added. The mineral breaks with a splintery fracture ; hardness 3·5 ; specific gravity 3·025. In the closed glass tube it yields, on strong heating, a small amount of water which reacts alkaline ; it is not decomposed by acids. Thin splinters turn white before the blowpipe and fuse with some difficulty on the edges to an enamel of a fine pink colour—a reaction verified by a number of trials, and probably also attributable to the small trace of chromium sesquioxide, whilst also pointing to the correctness of the accepted supposition of the colour of the ruby being due to this oxide.

Although the owners of the claim at Back Creek were directly informed of the nature and value of their discovery, and of the probability of the heavy sand obtained during the process of gold washing containing rubies of some value in jewellery, no new find of the precious stone has since been reported. The gold drift of the locality is, according to Sir James Hector, mainly composed of moraine matter, derived from the high crystalline schist ranges inland, and it does not lie outside the bounds of probability that a hardy prospector may some day in these ranges discover the place of derivation of the ruby boulder, where really valuable stones are very likely hidden.

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