formulae of the amphiboles from the two specimens are $(K_{0.25}Na_{1.57}Ca_{0.82})(Mg_{0.04}Fe_{4.72}Mn_{0.11}Ti_{0.20}Al_{0.08})(Si_{7.78}Al_{0.22})O_{23}$ for SK 213 and $(K_{0.29}Na_{2.09}Ca_{0.47})(Mg_{0.07}Fe_{4.57}Mn_{0.12}Ti_{0.15}Al_{0.19})Si_{8.00}O_{23}$ for SK 887. It is apparent that the Mg/(Mg+Fe) ratios and amounts of Al in Z are so low in both these amphiboles that their compositions may be treated in terms of the end-members ferro-richterite $Na_2CaFe_5^{2+}Si_8O_{22}(OH)_2$, arfvedsonite $Na_3Fe_4^{2+}Fe^{3+}Si_8O_{22}(OH)_2$, and riebeckite $Na_2Fe_3^{2+}Fe_2^{3+}Si_8O_{22}(OH)_2$. Fig. 1 is a plot of Ca versus (Na+K), which shows the projected compositions of the Skye amphiboles relative to these three end-members and other comparable naturally occurring amphiboles. It is clear from fig. 1 that the Southern Porphyritic Epigranite amphibole is close to ferro-richterite in composition, while the Maol na Gainmhich Epigranite amphibole analyses lie midway between the ferro-richterite and arfvedsonite end-members, near to the projected composition of the arfvedsonite formula proposed by Miyashiro (1957).

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Erratum: Table I, SK 213, 2nd anal., TiO_2 1·43.

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Wroewolfeite and other langite-group minerals from Blackcraig, Kirkcudbrightshire

THE East and West Blackcraig mines and dumps (O.S. one-inch sheet 73, 445 645) are situated some two and a half miles south-east of Newton Stewart and the mines produced primarily lead and zinc ore. The main vein occupied a shatter belt with country rock infill and strings and patches of galena, zinc blende, and chalcopyrite. Gangue minerals are mainly calcite, dolomite, and quartz (Wilson, 1921).

A suite of specimens collected from the West Blackcraig dumps carry the typical primary sulphides galena, sphalerite, and chalcopyrite, together with their characteristic alteration products cerussite, linarite, hemimorphite, hydrozincite, malachite, brochantite, and aurichalcite. The new mineral wroewolfeite (Dunn and Rouse, 1975) has been identified on two specimens from the suite together with posnjakite and langite. Wroewolfeite forms tiny, dark blue individual grains on one specimen and bladed crystal aggregates projecting into a small fissure on the second. It is conceivable that wroewolfeite was more common in the present samples, for in and close to the fissure are areas of brochantite of a configuration suggesting that the brochantite is pseudomorphous after wroewolfeite. Posnjakite (for the U.K. reported only from Cornwall, by Knight and Barstow, 1970) is also dark blue and usually intimately associated with serpierite, and may possibly alter to brochantite. Langite occurs alone, or with brochantite, as either blue scales or tiny, clear blue tabular crystals showing perfect pinacoidal cleavage. Serpierite, a rare mineral for the British Isles, and reported only from Killarney (Russell, 1927), the Lake District (Kingsbury and Hartley, 1957), and Staffordshire (Braithwaite and Knight, 1968) is a fairly common associate of the langite-group minerals. In colour, the serpierite is sky blue and is present as pearly, fibrous to lath-like aggregates partly investing the specimens.

Apart from the primary sulphides already noted other minor sulphides occur and include pyrite and rare siegenite, marcasite, and millerite; the last forms characteristic capillary crystal bundles in cavities. Aurichalcite displays a variety of forms from waxy botryoidal crusts to radiating flaky aggregates and is a common secondary mineral, in contrast to rare erythrite, which reflects the paucity of arsenic–cobalt minerals.

Knight and Barstow (1970) attributed the origin of the Cornish posnjakite to post-mining percolation of copper-bearing ground waters. The langite-group minerals, and some of the brochantite, from Blackcraig could conceivably have formed by a similar mechanism, either within the mines or the dumps.

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