

angle and extinction angle are approximate determinations in sodium-light.

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Jarosite and natrojarosite from the Lake District.

JAROSITE ($\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6$) is a mineral that may easily be overlooked, commonly occurring as soft earthy aggregates or crusts of microscopic crystals, ranging from buff- and golden-yellow to brown in colour; in these forms it can readily be confused with 'limonitic' matter. While it does not appear to have been previously recorded in Britain, we have found that it is by no means rare in the Lake District and we have confirmed it from the following localities:

Grains Gill, Carrock Fell: crusts of very small golden-yellow to brown crystals on white vein-quartz from the 'granitic' suite of veins; it is associated with pale yellowish-buff, fine-grained, earthy ferriferous alunite (B.M. 1956, 76; 1958, 43).

Higher Brandy Gill, Carrock Fell: small compact masses of glistening yellow-brown crystals in the outcrop of an east-west lead-copper vein near the head of the gill on the western side (B.M. 1958, 44); also in similar crystalline patches in vein-quartz derived from an old cross-cut on the eastern side.

Burdell Gill, Caldbeck Fells: in gossany vein-stuff from a north-south iron-manganese vein tried near the head of the Gill, 400 yards south-west of Coomb Height; forms compact brown crystalline masses and small (up to 2 mm.) brown rhombohedral crystals on goethite and saccharoidal quartz. The crystals resemble brownish pharmacosiderite also occurring here (B.M. 1956, 78; 1958, 45).

Netherrow Brow, Caldbeck: in oxidized vein-material derived from an old collapsed cross-cut near the farm of Nether Row, driven on a north-west-south-east vein, as crystalline aggregates, of a golden-brown colour, in saccharoidal quartz (B.M. 1956, 75; 1958, 46); also in similar vein-

material from an old cross-cut, almost certainly to the same vein, between Sandbed and Potts Gill mines, half a mile to the south-east.

Potts Gill mine, Caldbeck: occurs as golden-yellow to brown fine-grained crystalline aggregates in oxidized vein-material from a small copper vein cut by the old no. 1 cross-cut; it is associated with various secondary arsenates.

Ingray Gill, Caldbeck: in oxidized vein-material from the northernmost of the two old cross-cuts near the head of the gill; occurs in small brown rhombohedral crystals, some of them altering to 'limonite', with arsenates.

Higher Roughtongill, Caldbeck Fells: occurs as a yellow to brown powdery aggregate, associated with beaverite, beudantite, and chrysocolla in chalcedonic quartz, in the outcrop of the south vein along the flank of Balliway Rigg (B.M. 1956, 77; 1958, 47).

Wanthwaite mine, St. John-in-the-Vale, near Threlkeld: occurs as a coating of yellow, microscopic crystals on quartz, with pyrite, arsenopyrite, and graphite, from the southernmost of the two veins at this mine. This vein occupies a fault between black Skiddaw Slates (on the north) and Borrowdale Volcanics (B.M. 1958, 48).

Natrojarosite.

While the southernmost vein at the Wanthwaite mine yielded jarosite, the northern vein yielded its rarer relative, natrojarosite ($\text{NaFe}_3(\text{SO}_4)_2(\text{OH})_6$). Practically no details are known about this mine, which included two veins about 200 yards apart; these veins have been referred to by J. Clifton Ward¹ and in the subsequent literature as 'copper-veins', but in fact the metallic minerals are mainly arsenopyrite and pyrite with some blende, galena, stibnite, and sulpho-salts, in a quartz-carbonate gangue; copper minerals are only present in traces. The northern vein occupies the faulted boundary between the main, eastern exposure of the St. Johns or Threlkeld microgranite (on the north) and Skiddaw Slates, and has been tried from three cross-cuts just beneath its outcrop on Clough Head, from another cross-cut some 300 feet lower down, and from a day-level, directly on the vein, a further 100 feet below the middle cross-cut. The vein is extremely gossany at its outcrop and it was in such material that the natrojarosite was found, in aggregates of small (up to 0.5 mm.) golden-brown rhombohedral crystals on massive and botryoidal goethite, the crystals showing combinations of the basal plane c {0001} with e {10 $\bar{1}$ 1} and s {01 $\bar{1}$ 2}. In the hand-specimen they

are indistinguishable from jarosite but were confirmed as natrojarosite by their X-ray powder patterns (B.M. 1958, 49).

A closely allied mineral, containing 1.99 % Na_2O and 3.5 % K_2O and showing affinities to both natrojarosite and alunite, has been collected from a quartz-carbonate vein cutting a highly altered quartz-dolerite at Embleton Quarry, about 2 miles west of Bassenthwaite Lake railway station.

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¹ The Geology of the northern part of the English Lake District, 1876 (Mem. Geol. Survey).

Two beryllium minerals new to Britain: euclase and herderite.

BERYLLIUM minerals are by no means common in the west of England, and many of the recorded occurrences are from old specimens or localities where they are now no longer obtainable or extremely rare. Several further new occurrences of beryl and other rarer beryllium minerals have, however, recently come to light in both Devon and Cornwall; among these rarer species, euclase and herderite are interesting additions to the list.

Euclase. Cligga Head has long been known as a locality for well-crystallized topaz; though widely distributed as an accessory in the greisen and as small crystals in many of the quartz-veins and joints, the best specimens have been found in quartz-tourmaline-topaz veins, which are barren of metallic minerals; these veins are somewhat restricted in their occurrence. The crystals are prismatic in habit, usually slightly flattened laterally in one direction, and are colourless, yellowish, or sometimes bluish, and may reach 7 or 8 mm. in length. A description of the occurrence and of the crystals found there was given by Sir Arthur Russell¹ in 1924. Though now not so easily found as previously, crystals of topaz can still be collected by breaking open portions of quartz-veins, *in situ* when accessible, or in blocks of greisen lying among the mining debris or which may have fallen from the cliffs.

It is in part of a quartz-vein from one of such blocks, collected in 1949, that euclase has now been found. The block was among a pile of