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Notes on some minerals either new or rare to Britain.

(With Plate I.)

By Sir Arthur Russell, Bart.

[Read January 23, 1941, June 5, 1941, and January 28, 1943.]

1. *Gold nugget from Leadhills, Lanarkshire.*

On June 6, 1940, Mr. John Blackwood of Leadhills, while searching for gold in the alluvial wash at the head of the Shortcleuch Water, Leadhills, Lanarkshire, a spot which has for many years been the happy hunting ground of Mr. Blackwood and John D. Weir, Leadhills' two most persistent and successful gold winners, was lucky enough to discover a water-worn mass of gold in quartz weighing 501·2 grains, by far the largest and richest specimen that has been found within the memory of those living in the district. The specimen (plate I) was found while removing a mass of rock at a depth of about 3 feet, the exact spot being a few yards from the east bank of Shortcleuch Water, about midway between the ruined Lowther Cottage (wrongly shown on the six-inch Ordnance map, Lanarkshire 49 NE., as Lauder Cottage) and the junction with the Windgate Burn (Windgate Foot).

Alluvial gold is said to have been first discovered in the Leadhills–Wanlockhead district in the reign of James IV of Scotland, 1488–1513, and there are records of its being worked between 1511 and 1513, the subsequent operations affording a fascinating chapter in the history of British mining. Both Shortcleuch and its tributary the Windgate Burn were the scene of operations by Sir Bevis Bulmer between the years 1578 and 1592 and again in 1603, and the present specimen was found in one of the small patches of ground which had apparently escaped the attention of successive generations of gold seekers.

The gold of the Leadhills–Wanlockhead district occurs in alluvial clay, gravels, and silt bordering the streams, forming terraces, and filling depressions on the lower slopes of the hills which are formed of Ordovician slates and grits. As typical of the occurrence, a terrace of small extent worked by John D. Weir in 1936 on the west side of the Windgate Burn at its junction with the Dun Grain Burn afforded 12 to 15 inches of gold-bearing silt resting upon slaty rock, and overlain by about 5 feet of gravel with occasional large boulders. Accompanying the gold are nodules of limonite up to one inch or more in size, the only other heavy minerals met with being pellets of cerussite and pyromorphite derived from the disintegration of neighbouring lead veins. Practically every bucket full of the silt yielded a minute grain or two of gold. The gold here is as a whole coarse, though as the method of recovery employed is a crude arrangement of launders with riffles and grating, it fails to collect any fine or float gold.

The specimen forming the subject of these notes is now, thanks to the kindness of Mr. Blackwood, in the writer's possession. It consists of a water-worn, though still in part crystallized mass of slightly yellowish stained quartz measuring $4 \times 3 \times 1\frac{1}{2}$ cm. thickly coated on one side and to a slight extent on the other with massive gold rising to form a solid tongue in one corner. The proportion of gold to quartz is probably rather less than half by weight, practically the whole of the gold being on the exterior of the mass of quartz and hardly penetrating it. The gold shows marked signs of attrition, and it is evident that much more gold was originally attached and has been loosened and removed by attrition, the shape and size of the still adhering portions being a counterpart in every way to the small nuggets or pellets usually found in the district, thus affording a direct proof, if proof were wanted, that the whole of the alluvial gold here is derived from quartz veins.

In concluding this note I should like to pay tribute to the perseverance and skill shown by Messrs. Weir and Blackwood in their years of gold seeking, which, if not particularly remunerative, at any rate presents an extraordinary fascination and one which in happier times the writer has shared.

For the beautiful photographic reproduction (pl. I) of the specimen I am indebted to Dr. A. J. Bull, who as will be seen has attained remarkable success with so difficult an object.

2. *Gold on Russellite from Castle-an-Dinas wolfram mine, St. Columb Major, Cornwall.*

During a recent minute examination of several hundreds of pellets of pure and impure russellite which had been recovered from the jigs concentrating the wolframite at this mine in July 1934, two pellets of comparatively pure russellite about the size of split peas were found to show on their rounded surfaces blebs of bright gold easily visible to the naked eye. One pellet shows two and the other a larger single bleb $\frac{3}{4}$ of a millimetre in diameter. In addition to the gold there are also embedded in the russellite, quartz and minute brushes of black tourmaline. These pellets of russellite were derived from wolfram ore coming from a stope between no. 1 and no. 2 levels in slate (killas) as described in the pages of this magazine.[1]

The occurrence and association at Castle-an-Dinas is particularly interesting since there is one reliable record only of visible gold having previously been found in a lode in Cornwall. This was at Wheal Sparnon, Redruth, where a single specimen showing minute particles of gold scattered over quartz was picked up on a dump by John Garby in 1844.[2] The dump was derived from a cross lode in slate which yielded much smaltite associated with native bismuth and fluorite. Garby was a competent mineralogist and tested the gold, so the occurrence may be looked upon as authentic. The specimen was presented by him to the Penzance Museum where, however, it cannot now be traced, although a most careful search was made on my behalf by Mr. W. P. Simmons, the Curator.

[1] M. H. Hey and F. A. Bannister, Russellite, a new British mineral. Min. Mag., 1938, vol. 25, pp. 41–55.

[2] J. Garby, Notice of the occurrence of gold in a cross-course in Cornwall. Trans. Roy. Geol. Soc. Cornwall, 1846, vol. 6, p. 266.

3. *Realgar and Arsenolite from Cornwall.*

The occurrence of large masses of native arsenic in ophitic dolerite (greenstone) in the Burraton Combe quarry, St. Stephen's by Saltash, Cornwall, was described by myself in 1924.[1] Since then, on examining some further specimens discovered with the original material in 1922, one was found to show small though very definite quantities of realgar, a mineral which has hitherto not been recorded from Great Britain.

The realgar occurs as small aurora-red crystalline patches and long prismatic crystals up to 1¼ mm. in length embedded in cleavage masses of calcite resting directly upon a reniform mass of native arsenic upon which is also a good deal of arsenolite, yellowish dolomite, and small prismatic crystals of quartz. The prismatic crystals are too rough to afford measurements; they are vertically striated and show distinct cleavage parallel to *b* (010), the prism zone being obviously a combination of (010) and (110).

In describing the occurrence of the native arsenic it was mentioned that traces of arsenolite were present. Among the further specimens which I obtained, two show hollow rounded surfaces in the native arsenic which are more or less completely filled with a thick crust of creamy-white to in part slightly yellowish botryoidal arsenolite. Under the microscope the spheres are seen to be composed of minute flaky crystals with irregular fretted boundaries and a pearly lustre. From some of the spheres project stalactites and delicate branching threads studded with extremely minute octahedra. Heated in a closed tube the arsenolite sublimes completely and redeposits as minute octahedra.

Always a rare substance in the natural state, one of these specimens is a remarkably fine example of the mineral. The only other record of the occurrence of arsenolite in the British Isles is that given by R. P. Greg and W. G. Lettsom in 1858, who state that it was found as acicular crystals filling cavities in masses of smaltite from Wheal Sparnon, Redruth, Cornwall, and occasionally investing ores of cobalt at other localities. No specimens either from Wheal Sparnon or any other British locality are, however, known to me.

4. *Orpiment from Clevedon, Somerset.*

It is a curious fact that although specimens of orpiment from a British locality have been preserved for over sixty years in two provincial museums, no reliable record of its occurrence as a British species has hitherto been made.[2] The follow-

[1] A. Russell, A notice of the occurrence of native arsenic in Cornwall, &c. Min. Mag., 1925, vol. 20, pp. 299–304.

[2] In the year 1860 Mr. Alphonse Gages of Dublin contributed a short paper entitled 'On the formation of orpiment in a mass of sulphate of barytes, found interstratified in the carboniferous limestone near Silvermines, County of Tipperary'. Journ. Geol. Soc. Dublin, 1860, vol. 8, pp. 243–244 and p. 246. This contains the very unconvincing statement that a mass of sulphate of barytes, coloured by sesquioxide of iron, and traversed by a series of filiform veins of galena and arsenical iron pyrites showed a slight coating of orpiment here and there, more of which was produced by a treatment with dilute hydrochloric acid. The specimen came from the old workings in the townland of Ballynoe, Silvermines. Of orpiment I have failed to find a trace at Ballynoe, although in the adjoining townland of Ballygown South traces of a bright yellow coating occur on some of the barytes-hemimorphite-ochreous vein-stuff. This coating contains cadmium and results from the alteration of cadmiferous blende. Similar coatings from other localities have usually been amused to be greenockite; Mr. F. A

ing particulars are all I have been able to glean with regard to a find of this mineral which is both interesting and mysterious and which for the present at any rate remains an enigma. Some time prior to his death on May 30, 1880, Mr. W. W. Stoddart, F.G.S., F.C.S., F.I.C., Public Analyst for the City of Bristol and County of Gloucester, of Sneyd Park, Bristol, and an original member of the Mineralogical Society, presented to the City of Bristol Museum specimens of orpiment which, according to the label in his handwriting, he had obtained along with a small quantity of realgar from alluvial clay at the Clevedon Brick and Tile Works, Clevedon, Somerset. There is also in the museum at Weston-super-Mare a single exactly similar specimen labelled Clevedon, but with no particulars as to the donor, but which it seems probable was also presented by Mr. Stoddart. The date of Mr. Stoddart's discovery of this orpiment would appear to have been between the years 1877 and 1880, as the mineral is not mentioned in a paper which he published in 1877 entitled 'Notes on the metals found near Bristol', which includes Clevedon as a locality for malachite, &c.[1] On my informing Dr. F. S. Wallis, the Deputy Director of the Bristol Museum, of my interest in this orpiment, he most kindly placed one of the small masses at my disposal at the beginning of 1940. Since then all of the remaining specimens along with the whole of the Bristol Museum's valuable collection of minerals have been entirely destroyed by German bombing, and there remain of this orpiment but two small pieces, the one in my possession and the other in Weston-super-Mare Museum. All of the specimens were precisely similar and consisted of small lemon-yellow foliated masses of pure orpiment, some having a little adhering grey clay, the piece in my possession measuring $2 \times 1\frac{1}{2}$ cm., that in the Weston-super-Mare Museum being a little larger. None of the realgar, which, according to Mr. Stoddart's label, accompanied the orpiment in small amount, appears to have been preserved.

The Clevedon Brick and Tile Works are situated three-quarters of a mile south-west of Clevedon station on the west side of, and directly adjoining the Strode road (six-inch Ordnance map Somerset 4 S.E.). In March of 1941 in company with Sir Lewis Fermor I visited the brick works and we were able to make a careful examination under the guidance of the manager, Mr. A. J. May, who went out of his way to afford us information. Clay has been dug here for at least a hundred years, the area occupied by the old pits covering several acres. At present one large pit is in operation although at the time of our visit it was partially filled with water. In no case, even in the past, has clay been dug at a greater depth than 10 or 11 feet. The pits lie very near the northern edge of the extensive alluvium flat which stretches between Clevedon and Bridgwater, while at Clevedon itself an at first narrow, but gradually widening range of hills of Old Red Sandstone and Carboniferous Limestone with pockets of Dolomitic Conglomerate, extends from the mouth of the Severn to Bristol. The clay, which is obviously not older than Pleistocene and possibly of post-Pleistocene age, has a uniform grey colour, is full of small hollows left by decayed rootlets, and

Bannister tells me, however, that X-ray photographs which he has taken of exactly similar material from Mill Close mine, Derbyshire, although containing cadmium do not give the greenockite pattern.

[1] W. W. Stoddart, Notes on the metals found near Bristol. Proc. Bristol Naturalists' Soc., 1877, new series, vol. 2, pp. 68–76.

contains numerous minute fresh- and brackish-water shells and also shells of the oyster all indicating salt marsh or estuarine conditions. Mr. May also on one occasion found bones of the ox and the lower incisor tooth of a pig, both of which he presented to me. In addition to the organic remains, small pellets and cleavage masses of calcite not much corroded, up to 1 cm. in size, are fairly plentiful.

The occurrence of orpiment in a Pleistocene clay under the conditions described is so remarkable that one would have been inclined to doubt its authenticity were it not for the fact that Mr. Stoddart was besides being a highly qualified chemist an enthusiastic investigator of local minerals; moreover a microscopic examination of the clay adhering to the specimen in my possession shows a complete similarity to that of the Clevedon Brick Works. On being shown a specimen of the orpiment, the oldest clay worker stated that he had never noticed anything of the kind while digging, his experience, however, going back only some forty years.

Speculation as to the origin of this orpiment is perplexing. Orpiment occurs in clay at several foreign localities, notably at Tajowa in Hungary, but always under conditions more or less explicable. That the Clevedon mineral was formed *in situ* seems highly improbable; and almost equally unsatisfactory is the supposition that it was derived from a mineral vein in the adjacent limestone or Dolomitic Conglomerate, for though a very soft mineral it shows no signs of attrition. In the latter connexion it may be mentioned that both galena and baryte with a little malachite and chessylite occur in Dolomitic Conglomerate exposed in the old quarry near Clevedon pier. Another possibility has suggested itself that the orpiment is a relic of Roman usage, for it is well known that the mineral was utilized as a pigment by that people under the name of auripigmentum.[1] Beyond the fact, however, that there are remains of the Roman occupation in the district I have been unable to find evidence of any such antiquities having been found in the immediate vicinity of the brick works, though curiously enough some years ago during the exploration of the well-known Wookey Hole cave in the Mendips, by Mr. H. E. Balch, a vessel was found containing a small quantity of fine red powder which Dr. J. Newton Friend[2] subsequently proved to be realgar. The vessel containing the realgar was found in the Roman layer in the cave, and is now preserved along with its contents in the Wells Museum.

My thanks are due to Dr. F. S. Wallis of the Bristol Museum, to Mr. W. H. S. Roberts of the Weston-super-Mare Museum, and to Mr. A. J. May of the Clevedon Brick Works, all of whom have afforded me help in trying to unravel the mystery of this occurrence.

5. *Semseyite from Carnarvonshire.*

There is in the extreme north-east corner of Carnarvonshire a small and long-forgotten antimony mine which as far as I can ascertain has never been mentioned in any literature. The mine Bwlch is situated on the eastern flank of a small hill

[1] The Natural History of Pliny. John Bostock and H. T. Riley, 1898, vol. 6, pp. 104-105. Auripigmentum (orpiment) 'A mineral dug from the surface of the earth in Syria, and much used by painters'.

[2] J. Newton Friend. Realgar in Wookey Hole, Somerset. Nature, London, 1937, vol. 139, p. 72.

210 yards north-west of Bwlch farm, Deganwy, near Conway. My attention to it was first awakened many years ago by two old specimens of stibnite in the Museum of Practical Geology which are labelled Castell Deganwy, suggesting that there must have been a mine in that neighbourhood. In 1938 during the turning out of some duplicate or inferior specimens in the collection belonging to the museum of the Royal Geological Society of Cornwall at Penzance, I chanced to notice three specimens bearing old labels in the same handwriting 'Antimony from Bwlch mine, Conway. W. Parry.' Here was the information needed in order to find the exact whereabouts of the mine, and accordingly in 1940 I visited Deganwy and after considerable inquiry succeeded in locating the old working, the position of which has already been indicated. It is shown on the six-inch Ordnance map, Carnarvon 5 NW. (1919), as Trial Shaft.

At what date this mine was worked I have been unable to ascertain, but it was evidently prior to 1864, the date of Sir Warington W. Smyth's catalogue of the original Museum of Practical Geology collection, and judging from the labels on the Geological Society of Cornwall specimens the date was much earlier. W. Parry was probably one of the Parrys of whom there were several generations connected with the Halkyn district mines.

The workings consist of a single shaft, still open on the flank of the hill. This shaft is sunk on the vein and has a short shallow open-cut and adit leading to it. There are said to be two levels driven from the shaft in addition to the adit. The only dump is that around the shaft, and from its small size the workings can have been only on a very small scale. A little farther north on the same hill there are indications of two further slight trials. The direction of the vein, which cannot now be seen, is apparently east and west, the enclosing rock being an ophitic dolerite with Carboniferous Limestone in the immediate vicinity. A good deal of the igneous rock is in the form of spheroidal concretions. The vein filling consists of quartz and chalcedonic chert, often in globular aggregates, with here and there patches of stibnite and what is more interesting the quite rare mineral semseyite. Stibiconite, bindheimite, blende, galena, pyrite, ankerite, anglesite, and baryte are also present in small quantities. The minerals here described were, with the exception of five specimens, obtained by digging into the old dump.

Semseyite ($9PbS.4Sb_2S_3$, monoclinic) occurs both massive and crystallized, its colour being steel-grey to iron-black. When massive it shows small quite well-defined cleavages parallel to (111) and forms patches up to 3 cm. in diameter in white quartz along with stibnite and a little yellow blende. Of the three specimens collected by W. Parry, one has proved to be semseyite and consists of a somewhat granular mass 6×4 cm. intergrown with yellow blende and externally altered to a brownish-yellow crust of bindheimite, grey drusy quartz being also present.

Of the crystallized mineral only one really good specimen was found after an extended search. This shows a cavity $4 \times 2\frac{1}{4}$ cm. in quartz lined with small colourless prismatic crystals of that mineral upon which are numerous, though for the most part confusedly aggregated, crystals of semseyite. These crystals attain a length of 2 mm. and are simple combinations of the forms (001), (100), and (112). They are of flat prismatic habit and are elongated in the direction of the c-axis, the (112) faces being deeply striated parallel to their intersections with (001), and both corners and edges are more or less rounded. This habit is exactly similar to that of semseyite from Wolfsberg, Harz, described and figured

by Dr. L. J. Spencer;[1] the crystals are, however, more elongated than those shown by him. Unfortunately the crystals are, with one or two exceptions, invested with a resinous honey-yellow crystalline crust the surface of which in part has the appearance of liquid gum. This crust is obviously an alteration product allied to or identical with bindheimite, and in some cases sections of broken semseyite crystals show that partial alteration to this substance has extended throughout, while in a few cases the transformation is complete leaving hollow pseudomorphs; the same substance also invests the quartz crystals to a lesser degree. One or two crystals terminated at both ends are bare of this crust and dull grey in colour and show the characteristic striations; the faces are, however, too rough and dull to admit of satisfactory measurements, although sufficiently good to enable the forms to be identified. The characteristic habit, the colour, and the presence of lead, antimony, and sulphur at once indicated the mineral to be semseyite, and this was definitely confirmed by an X-ray photograph which Mr. F. A. Bannister most kindly took.

On two specimens the spaces between the semseyite crystals contain very minute hair-like filaments of a grey metallic mineral either stibnite or jamesonite (plumosite); these also are in some cases completely altered to an almost colourless and pale yellow crystalline mineral. A single small colourless crystal of anglesite was observed in one cavity in the semseyite. The only other known British locality for semseyite is the Glendinning antimony mine, Westerkirk, Dumfriesshire, where the mineral was discovered by myself in 1918 and described by Dr. G. F. Herbert Smith in the pages of this magazine.[2]

Of the other minerals occurring in Bwlch mine the stibnite forms typical coarsely bladed masses in quartz, one of the two specimens in the Museum of Practical Geology being free from admixture and of several pounds weight. The specimens obtained from the old dump often have their exterior altered to a thin yellow resinous crust of stibiconite. More rarely the stibnite forms rosettes of radiating prisms in quartz, the small associated bipyramidal quartz crystals having included bent rods of stibnite. Galena is rare, cavities in it occasionally show very small bright octahedra. Blende is present in small quantity, of a reddish-brown colour and as minute crystals. A little granular pyrite was observed. Baryte appears to be rare, a single specimen only was found: this shows ordinary white lamellar baryte and strings of small parallel colourless tabular crystals up to 4 mm. on drusy quartz, the forms observed by measurement being (001), (110), (102), and (011). Small rhombs of ankerite were also noted.

I must here express my thanks to Mr. Gordon Simcox, the owner of Bwlch farm, for most kindly aiding me in my examination of the locality.

6. *Dundasite from Wheal Rose, Sithney, Cornwall.*

In 1937 my friend the late Dr. R. W. T. Gunther of Oxford acquired an old collection of minerals, rocks, and fossils which had for nearly a hundred years lain hidden in the Literary and Scientific Institute at Frome in Somerset. The collection was formed by Lady Elizabeth Anne Coxe Hippisley (17 –1843) of

[1] L. J. Spencer, Plagionite, heteromorphite and semseyite as members of a natural group of minerals. Min. Mag., 1899, vol. 12, pp. 55–68, fig. 2, p. 59.

[2] G. F. Herbert Smith, Semseyite from Dumfriesshire. Min. Mag., 1919, vol. 18, pp. 354–359.

Stone Easton Park, Radstock, Somerset, and on the death of Dr. Gunther it passed into my possession. Among several interesting contributors to it was Sir Humphry Davy, who presented a small number of Cornish specimens apparently about the year 1810. One of these bears Lady Hippisley's characteristic neat form of label which reads 'Galena with yellow oxide of iron & white carbonate of lead. Wheal Rose. D', the D standing for Davy; it consists of a mass of coarse cleavage galena with a few spots of chalcopyrite and a little yellow ochreous limonite. One side of the specimen is occupied by a shallow cavity lined with small tabular twinned crystals of cerussite upon which are plentifully sprinkled spheres and tufts of snow-white dundasite, some bipyramidal crystals of quartz being also present. The dundasite spheres are typical of the mineral and are built up of minute silky radiating acicular crystals.

Another specimen contained in a small collection of Cornish minerals which had belonged to Miss Morshead of Treniffle near Launceston came into my possession in 1913. It shows characteristic spherical aggregates of snow-white or slightly yellow stained dundasite on a layer of quartz with slender prismatic crystals of cerussite, bipyramidal crystals of quartz, and yellow ochreous limonite, upon somewhat blackened galena with a good deal of chalcopyrite. Though not labelled, this specimen almost certainly also came from Wheal Rose, which has produced a number of interesting lead minerals including anglesite, phosgenite, laurionite, paralaurionite, cerussite, and pyromorphite.

7. *Dundasite from Port Quin antimony mine, St. Minver Highlands, Cornwall.*

This small and long-forgotten antimony mine is situated in a field 750 yards south of Port Quin village about midway between the road and the stream (six-inch Ordnance map, Cornwall 19 NW., on which, however, it is not marked). A small dump on the high ground marks the site of a shaft and a little farther east an adit level has been driven in from the side of the valley and presumably communicates with the shaft. The only information which I have been able to glean respecting this mine was obtained during my first visit to the spot in 1907. An old resident of Port Quin named John Hawke, then eighty years of age, informed me that it was worked by one Francis Kate about the year 1857 and that the lode had a north-east direction and was about 2 feet wide traversing slate (killas). The dump yields abundant jamesonite often superficially altered to bindheimite, the cavities in which contain small crystals of anglesite and minute octahedra of senarmontite, the other minerals found there being a little galena, blende, chalcopyrite, tetrahedrite, and spots of malachite and cerussite, with much quartz, chalybite, limonite, and very rarely dundasite of which two specimens were found. These show minute snow-white or slightly bluish spherical aggregates of silky radiating acicular crystals on brown cellular limonite with botryoidal brownish iron-stained allophane and a little cerussite. The presence of allophane recalls a similar association at three of the other British localities for dundasite: Welsh Foxdale mine, Trefriw, Carnarvonshire; Gorlan mine, Trefriw, Carnarvonshire; and Clements lead mine, Carrowgarriff, Maam, Co. Galway.

8. *Dundasite from Cyffty mine, Trefriw, Carnarvonshire.*

In May 1920 I received from my friend the late G. J. Williams, H.M. Inspector

of Mines for North Wales, a remarkably good specimen of dundasite which he had just found in Cyffty mine. This mine, now abandoned, is in the same neighbourhood as Welsh Foxdale or Pandora mine, the original British locality for dundasite, and was worked on a galena-blende lode traversing slate. The specimen consists of an angular fragment of black slate upon which are rhombohedral casts in greyish quartz and some blende and marcasite, both the quartzose casts and the slate being studded with long acicular crystals of cerussite upon which are numerous snow-white spheres of dundasite up to 1 mm. in diameter.

9. *Dundasite from Gorlan mine, Trefriw, Carnarvonshire.*

A specimen collected in this mine by Mr. G. J. Williams in 1921 during its last working, and which I received from him, consists of the following assemblage of minerals. Dundasite as a snow-white downy crust of very minute matted silky needles on gum-like brownish-yellow allophane which envelops prismatic crystals of cerussite and bipyramidal crystals of quartz, associated with small colourless crystals of anglesite, on galena, blende, radiating marcasite, and quartz. Anglesite has not previously been recorded from this district. Gorlan mine, like Welsh Foxdale and Cyffty, was worked on a galena-blende-marcasite lode traversing slate. At all of the British localities for dundasite the mineral was obviously the last formed of its associates.

10. *Wulfenite from Hartsop Hall mine, Patterdale, Westmorland.*

In 1933 among some specimens of fluorite which I collected at this mine is one which shows very minute crystals of wulfenite, a mineral hitherto recorded from only three other British localities. Hartsop Hall, an old lead mine, has for some years been again at work on a very small scale and the specimen to be described was obtained from no. 2 level on a lead lode traversing altered Borrowdale ash. The specimen consists of drusy quartz upon which are small greyish superficially altered cubo-octahedra of galena and small pale yellow cubes of fluorite, also a little calcite, platy aggregates of baryte, and a crystal or two of chalcopyrite. Upon the cubo-octahedra of galena and sometimes on the quartz are numerous very minute but sharp thin tabular crystals of wulfenite with crystals of cerussite. The largest crystal does not exceed ½ mm. along the edge. The colour is either smoky-brown or pale yellowish, and the crystals are simple combinations of (001) and (111), fig. 1. The measured angle (001) (111) $=65°\ 48'$–$65°\ 56'$, calc. $65°\ 51'$.

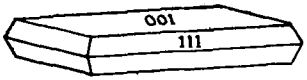

FIG. 1. Wulfenite from Hartsop Hall mine, Patterdale, Westmorland.

An X-ray photograph very kindly taken by Mr. F. A. Bannister definitely proves the mineral to be wulfenite. A more recent careful search failed to produce a single additional specimen.

I had hoped at first that these minute crystals might prove to be stolzite, a mineral which has been recorded many years ago from Force Crag mine, Braithwaite, Cumberland, but which has never been substantiated as a British species. In R. P. Greg and W. G. Lettsom's 'Mineralogy of Great Britain and Ireland', 1858, pp. 410–411 it is stated that stolzite was 'first noticed in this country by Mr. Greg, in very minute but measurable crystals, on macled crystals of black

carbonate of lead from Force Craig lead-mine, near Keswick. The crystals were of a greyish-white colour, brilliant', with combinations of (001) and (111), the figure given showing them to be of a similar, though somewhat stouter habit than the wulfenite here described. The specimen of stolzite mentioned by Greg would, one should have supposed, be in the Allan–Greg collection in the British Museum, but in spite of a careful search no trace can be found of any specimen either of cerussite or stolzite from Force Crag mine, neither is there a reference to such in the Allan–Greg MS. catalogue. In the absence of evidence that it was chemically examined it seems quite possible that Greg's mineral was wulfenite and not the very much rarer stolzite.

ARTHUR RUSSELL: GOLD NUGGET FROM LEADHILLS, LANARKSHIRE
(*Twice the actual size*)

MONOCHROME REPRINT OF ORGINAL COLOUR REPRODUCTION