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*An account of the minerals found in the Virtuous
Lady Mine, near Tavistock.*

(With Plates I-III.)

By ARTHUR RUSSELL.

[Read November 12, 1912.]

VIRTUOUS Lady Mine is situated in the parish of Buckland Monachorum on the right bank of the river Tavy close to its junction with the river Walkham, at a distance of three miles south of Tavistock in Devonshire. The mine has long been famous for the charm of its situation, and in addition possesses for the mineralogist an especial interest owing to the peculiar beauty and unusual character of the mineral specimens it has yielded. The early history of the mine is lost in obscurity, as also is the origin of its curious name, which, however, local tradition ascribes to Queen Elizabeth.

The earliest reference to the mine is one by the Lysons,¹ who state on the authority of Mr. John Taylor that it was working prior to 1807, but was abandoned in that year. It was working again in 1825, and abandoned in 1856, the last working being from 1870 to 1875, since when

¹ Rev. D. and S. Lysons, 'Magna Britannia,' vol. vi, Devonshire, 1822, p. cclxxxv.

no mining has been done. William Jory Henwood,¹ writing in 1843, gives the following facts concerning the mine. 'A sort of metalliferous bed, containing copper pyrites, with carbonate of iron, chlorite, and quartz occurs at Virtuous Lady: it bears about 20° S. of W., dips N. 10-15°, and varies from a few inches to 20 or 30 feet in thickness. The ores are distributed in the most irregular manner; sometimes large masses occur in the quartz, and soon split into strings; frequently these again expand, though not a few of them dwindle entirely away. Numerous ramifications of quartz extend into the slate, which near the bed contain many large and well-defined cubic crystals of iron pyrites, often imbedded in carbonate of iron. The workings on the south open to the surface, and their dimensions underground are about 100 fathoms long by 80 wide, the greatest depth is 15 fathoms. The cleavage of the slate in which it occurs dips S.'

There is a quaint and interesting description of the various minerals found in this mine and in the neighbourhood of Tavistock in a letter dated 1835 from a Mr. Edmund Pearse, surgeon of Tavistock, to Mrs. Anna Eliza Bray.² This Mr. Edmund Pearse (*b.* 1788, *d.* 1856) was an enthusiastic collector of local minerals, and his fine collection, which was particularly rich in Virtuous Lady specimens, has recently (1911) come into the possession of the writer, and forms the principal material for the present paper. The photographs reproduced in the accompanying plates represent with two exceptions specimens from this collection.

The following species have been found in this mine: chalcopyrite, pyrite, marcasite, mispickel, fluor, quartz, cassiterite, anatase, brookite, chalybite, chlorite, sphene, scorodite.

CHALCOPYRITE.

Chalcopyrite was the principal ore in this mine, the vuggy nature of the deposit permitting the formation of many fine crystals. Individual specimens are difficult to describe, but mention may be made of the following: Large groups of peacock-blue or bronze-coloured sphenoids

¹ W. J. Henwood, 'The Metalliferous Deposits of Cornwall and Devon,' *Trans. Roy. Geol. Soc. Cornwall*, 1843, vol. v, p. 140.

² Mrs. A. E. Bray (formerly Stothard), 'A description of the part of Devonshire bordering on the Tamar and the Tavy; its Natural History, &c., in a series of letters to Robert Southey, Esq.' 3 vols. London, 1836 (Mr. Pearse's letter in vol. iii, pp. 253-260). Another edition with a slightly different title, but with the same pagination, appeared in 1838; and a revised edition in 2 vols. appeared in 1879 under the title 'The Borders of the Tamar and the Tavy; their Natural History', &c.

in parallel position, their surfaces sprinkled over with brown, lenticular crystals of chalybite and small crystals of pyrite. Beautiful, highly iridescent, curved sphenoids with drusy surfaces, associated with opaque white quartz crystals, occupying the interior of large hollow cubes of chalybite (pseudomorphs after fluor). Groups of nearly black sphenoids on snow-white quartz crystals, with balls of chalybite. Chalcopyrite was also found here occasionally in a blister-like form, the surface being rough and of a dull brassy or nearly black colour.

Many of the crystals are somewhat obscure and complex twins, evidence of their nature being afforded by the different sets of striae. The twin-plane appears usually to be e (101), in which case similar faces are opposed across the twin-junction, the twin being symmetrical to the composition-plane. At the writer's request Dr. G. F. Herbert Smith

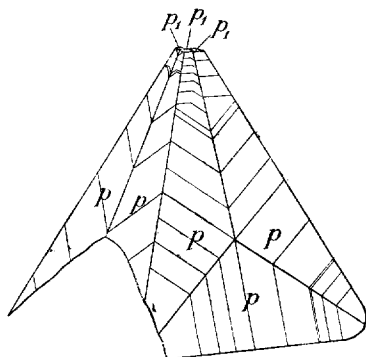


FIG. 1.—Twinned crystal (pseudo-tetrahedron composed of six individuals) of Chalcopyrite from Virtuous Lady Mine, Tavistock.

very kindly undertook the examination, and made a drawing (text-fig. 1), of a very complex crystal of this nature from the Pearse collection. The following is his description :—

‘The crystal resembles a regular tetrahedron, measuring about 2 cm. from a corner to the opposite face, and is an unusually fine example of twinning¹ about the face e (101). It springs clear of the specimen except for one edge (on the left-hand side at the foot in text-fig. 1) which merges into a mass of smaller crystals of the same mineral intergrown with a few milky, prismatic crystals of quartz.

‘Each apparent face of the tetrahedron consists of three distinct

¹ For a full discussion of this mode of twinning see L. Fletcher, *Phil. Mag.*, 1882, vol. xiv, pp. 276–291, and *Proc. Cryst. Soc.*, 1882, part ii, pp. 114–131.

triangular sectors, each of which is a face of the form p (111), and the crystal is composed of six individuals twinned with respect to one another. The adjacent sectors, one on each of any pair of contiguous faces, belong to the same individual, and the face c (001), were it present, would lie on the edge of the pseudo-tetrahedron. The faces p (111) are rough and somewhat distorted, and the reflections that they afford of the goniometer-slit are in certain instances indistinct. They are striated at right angles to the corresponding tetrahedron edge, and a subsidiary set of striations runs parallel to their intersections with the faces of the complementary form p_1 ($\bar{1}\bar{1}\bar{1}$). The sectors on the faces shown in the figure meet in salient angles, the measured values of which were $1^\circ 14'$, $1^\circ 17'$, $1^\circ 19'$, $1^\circ 22'$, $1^\circ 59'$; the value deduced from the fundamental angle, $(001):(101) = 44^\circ 34\frac{1}{2}'$, is $1^\circ 23\frac{1}{2}'$. On the face at the back the only two sectors which gave reflections are parallel; the under face has only one sector exposed. A few small bright faces of the complementary form p_1 ($\bar{1}\bar{1}\bar{1}$) were also present, and on the back of the crystal as shown were observed two small faces of the form z (201).'

PYRITE.

Pyrite was extremely abundant in this mine, the chloritic slate containing large isolated and very symmetrically developed cubes, which occasionally measure up to 4 cm. along the edge, and are amongst the best examples of this mineral which have been found in the British Isles. These cubes are often considerably elongated; some are dull and deeply striated, while others have smooth, bright faces. Large interpenetrating groups were common. The mineral was also found with the following associates: Very brilliant cubes showing small faces of o {111} and s {321}, with chalybite and crystals of chalcopyrite on transparent slender prisms of quartz. Brilliant cubes with the forms a {100}, o {111}, e {210}, s {321}, embedded in groups of steely-blue sphenoids of chalcopyrite. Small octahedra, o {111}, a {100}, studded over lenticular crystals of chalybite, also investing 'slipper' pseudo-morphs, and thickly encrusting large stout prisms of quartz coated with chalybite. Brilliant pentagonal dodecahedra e {210} up to 1 cm. in diameter, embedded in a greenish-grey chlorite-schist, were especially abundant in one part of the mine, and may still be found on the old burrows.

MARCASITE.

Marcasite was found here as curious specimens consisting of radial groups of long fan-like aggregates, projecting from a nucleus of cubes of

pyrite. These aggregates attain a length of 4 cm., and are built up of light yellowish-white, deeply striated, flat crystals, c {001}, m {110}, l {011}, elongated in the direction of the c -axis, many of them showing the characteristic twinning on m (Plate I, fig. 5). The specimens are somewhat liable to decomposition, more especially at the points where the marcasite is in contact with the pyrite. Greg and Lettsom¹ figure a crystal of marcasite from this locality showing the forms² c {001}, m {110}, r {014}, l {011}.

MISPICKEL.

Mispickel occurred here in very fine specimens, the most usual type consisting of groups of large interpenetrating crystals up to 3 cm. in length; they are tarnished bronze-yellow, and exhibit combinations of m {110} and t {013} with small e {101} (text-fig. 2). The faces of m

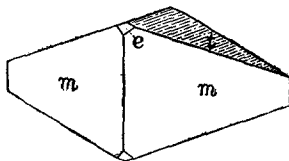


FIG. 2.—Crystal of Mispickel from Virtuous Lady Mine, Tavistock.

exhibit a platy structure, and those of t are furrowed by oscillatory combination. These crystals are often associated with chalcopyrite, and large, snow-white prisms of quartz studded over with balls of chalybite (Plate I, fig. 3). Also in silver-white crystals, occupying, with quartz crystals, large pseudomorphous cubic cavities in chalybite. More rarely the mispickel forms groups of large, prismatic, bronze-yellow crystals, m {110}, t {013}, measuring up to $2\frac{1}{2}$ cm. along the vertical axis, in the direction of which they are elongated (Plate I, fig. 2). Both types of crystals usually exhibit a polysynthetic growth, and show re-entrant angles on the edges between the adjacent m faces due to the presence of small faces of e {101}.

¹ R. P. Greg and W. G. Lettsom, 'Manual of the Mineralogy of Great Britain and Ireland,' 1858, pp. 281-282.

² The letters and indices of the crystal-forms adopted throughout this paper are as in Dana's 'System of Mineralogy,' 6th edit., 1892.

FLUOR.

Fluor, although now rather scarce, appears from the hollow 'box' pseudomorphs to have been abundant at one period of the lode's history. The writer has observed small, yellowish cubes associated with chalybite on the old burrows.

QUARTZ.

Very beautiful specimens of quartz have been found in this mine. They consist of large, milky-white, opaque, prismatic crystals up to 15 cm. in length, studded over with balls and lenticular crystals of chalybite, and were sometimes associated with fine crystals of mispickel (Plate I, fig. 3). In most cases the milky colour is due to one or more thin, white, drusy outer layers, the interior of the crystals being translucent. Quartz also occurred here in very slender tapering crystals studded over with balls of chalybite, and beautiful iridescent sphenoids of chalcopyrite; also in stout prismatic crystals, more or less completely coated with small crystals of pyrite.

The curious variety known as *Capped Quartz* appears, so far as Great Britain is concerned, to have been peculiar to this mine. It is referred to, and briefly described by the Lysons in their list of minerals occurring in Devonshire.¹ These crystals are more or less opaque, have a pearly lustre due to included air spaces, and are externally coated with a yellow film of limonite. They occasionally attain a length of 14 cm. The exterior of the prism portion is built up of many smaller crystals arranged in more or less parallel position, while the pyramid is regular and smooth. A light blow at the junction of the prism and pyramid causes an outer pyramidal cap to come off entire, leaving an inner pyramid perfect, and of a milk-white colour. This easy separation is apparently due to there being a thin film of some foreign substance between the successive parallel layers of the crystal. The writer has two very fine specimens of this variety of quartz from the Pearse collection, the smaller of which is shown in Plate I, fig. 1. The larger, a group showing over thirty crystals, two of which have had their caps detached, is referred to by Mr. Pearse in his letter to Mrs. Bray.²

¹ Rev. D. and S. Lysons, 'Magna Britannia,' vol. vi, Devonshire, 1822, p. cclxix.

² Mrs. A. E. Bray, loc. cit., 1836, vol. iii, p. 258.

CASSITERITE.

Cassiterite appears to have been a rare mineral in this mine. The writer possesses a specimen from the Pearse collection which shows minute, black, acute prismatic crystals ('sparable tin'), $m \{110\}$, $z \{321\}$, upon black sphenoids of chalcopyrite, milky-white quartz crystals, and balls of chalybite on a light greyish-green chloritic slate. The cassiterite was evidently the last mineral formed.

ANATASE.

The earliest reference to the occurrence of anatase in this mine appears to be one in Mr. Pearse's letter to Mrs. Bray (1835) in which he speaks of 'the brilliant well-defined crystals of titanium.'¹ Of a large number of crystals which have been examined and measured by the writer, the following remarks apply principally to a fine series of specimens contained in the Pearse collection, and also to crystals in the Brooke collection at Cambridge University which Dr. Hutchinson kindly placed at my disposal. The anatase forms very brilliant, black and perfectly opaque, tabular or pyramidal crystals, the two habits graduating from one to the other. One crystal found on the old burrows shows a distinct indigo-blue colour by transmitted light. The commonest form is a tabular combination of $c \{001\}$ with $p \{111\}$ (text-fig. 3). These crystals measure up to 3 mm. along the edge, and are often somewhat elongated in the direction of a horizontal axis, while occasionally owing to a very unequal development of the faces they are curiously distorted as in text-fig. 4. More rarely the crystals assume a pyramidal habit, the following combinations having been noted:—

$c \{001\}$, $m \{110\}$, $z \{113\}$, $p \{111\}$ (text-fig. 5).

$c \{001\}$, $m \{110\}$, $\chi \{337\}$, $p \{111\}$.

$c \{001\}$, $m \{110\}$, $\alpha \{103\}$, $\lambda \{449\}$, $p \{111\}$ (text-fig. 6).

$c \{001\}$, $m \{110\}$, $\alpha \{103\}$, $r \{115\}$, $\chi \{337\}$, $p \{111\}$.

The pyramid faces with the exception of p and z are usually more or less deeply striated horizontally, and yield banded images. The form ² $\{449\}$ gives, with (001), values ranging between $47^\circ 20'$ and $48^\circ 10'$, thus indicating some oscillation with $\{337\}$.

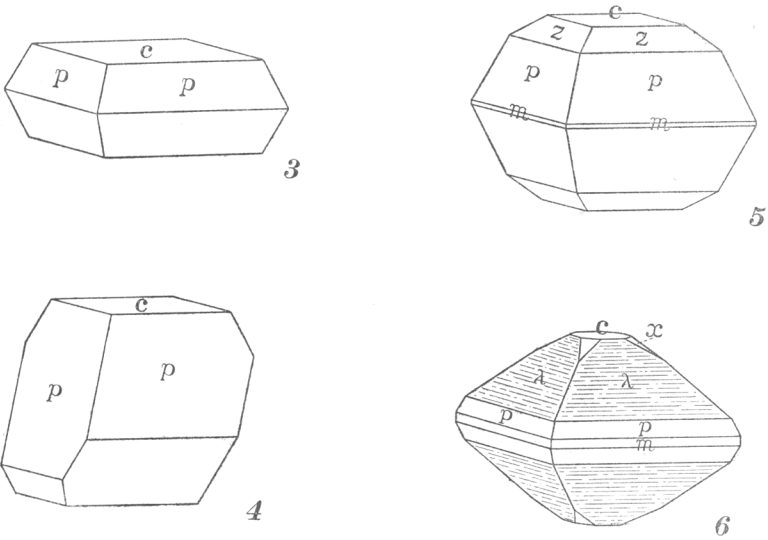
Greg and Lettsom mention and figure tabular crystals $c \{001\}$, $v \{117\}$, $p \{111\}$ from Virtuous Lady Mine. The form $v \{117\}$ has not,

¹ Mrs. A. E. Bray, loc. cit., vol. iii, p. 257.

² This form $\{449\}$ has previously been observed on anatase, from Nil-Saint-Vincent, Brabant, by W. Prinz, Bull. Acad. Belgique, 1907, p. 706.

however, been met with by the writer. The same authors also refer to a crystal from this mine in the Brooke collection, upon which the following forms had been identified: c {001}, m {110}, x {103}, l {1.1.10}, y {?}, v {117}, r {115}, ψ {225}, p {111}.¹

The anatase crystals occur either singly or in groups of two or more individuals on spherical aggregates of brownish, lenticular crystals of chalybite with small, opaque white quartz crystals, and a soft, greyish-green, highly chloritic slate, the interstices of which are filled with a soft, white, talcose mineral. Also in cavities, or embedded in compact,



FIGS. 3-6.—Crystals of Anatase from Virtuous Lady Mine, Tavistock.

green, scaly chlorite. More rarely with black, twinned sphenoids of chalcopyrite; or perched upon small, opaque white quartz crystals; or embedded in massive quartz; and very rarely as small, pyramidal crystals embedded in large cubes of pyrite. Good crystals may still be obtained by carefully searching the burrows and breaking open masses of the chlorite vein-stuff.

BROOKITE.

Greg and Lettsom state that brookite occurred in Virtuous Lady Mine as microscopic crystals embedded in chalybite, associated with anatase and chlorite.² The only specimen of brookite from this locality known

¹ R. P. Greg and W. G. Lettsom, *loc. cit.*, pp. 363-364.

² *Ibid.*, p. 366.

to the writer is one in the Pearse collection. It shows a single, minute, brown, prismatic crystal flattened parallel to a $\{100\}$ and about 1 mm. in length. There are at least three other forms present, represented by bright, well-developed faces, probably m $\{110\}$, t $\{021\}$, e $\{122\}$; these, however, could not be verified without removing the crystal, which projects from a cavity in a soft, greenish chlorite, upon which are balls of chalybite and large crystals of anatase.

CHALYBITE.

The mine has yielded many fine specimens of chalybite. They are almost invariably of the same type, consisting of light or dark hair-brown, flat disc-like or lenticular crystals, c $\{0001\}$, r $\{10\bar{1}1\}$, e $\{01\bar{1}2\}$, often studded over with small, brilliant octahedra of pyrite, and clustered about groups of snow-white quartz crystals (Plate I, fig. 4); or thickly investing large iridescent sphenoids of chalcopyrite. The basal plane c

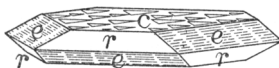


FIG. 7.—Crystal of Chalybite from Virtuous Lady Mine, Tavistock.

has a mottled appearance owing to the presence of cleavage cracks parallel to r , and is usually triangular in outline from a predominance of the rhombohedron e , while its surface is covered with small, triangular markings. The faces of r and e are rough, those of e being striated parallel to their intersections with c (text-fig. 7). On other specimens, the chalybite crystals are clustered together in the form of balls, which are perched upon white, prismatic crystals of quartz (Plate I, fig. 3), these latter specimens being especially characteristic of the mine. More rarely the chalybite assumes a simple rhombohedral habit r $\{10\bar{1}1\}$; a crystal of this description from the Pearse collection measures 4 cm. along the edge, and is built up of parallel individuals; it is associated with chalcopyrite and pyrite.

Amongst the most remarkable productions of this mine are the well-known pseudomorphs (epimorphs) of chalybite after fluor and barytes which were found in considerable abundance during the years 1832 and 1833.

The *pseudomorphs of chalybite after fluor*, now somewhat scarce and only to be seen in old collections, consist of hollow cubic shells of

dark to light-brown chalybite in translucent lenticular crystals, usually aggregated in more or less globular forms. They were known to the miners as 'boxes,' and vary in size from 2 to 10 cm. along their edges. Some are perfect on all sides and exceedingly symmetrical in outline, others are open at the top or sides, and have in their interior groups of large and most beautifully iridescent crystals of chalcopyrite, interspersed with white, prismatic crystals of quartz (Plate II, figs. 6-9). It is impossible to describe adequately the beauty of these specimens. There is a very fine and large specimen of this description in the British Museum (Natural History); while the writer possesses a very fine series which formed part of Mr. Edmund Pearse's collection. Amongst the most noteworthy of these latter specimens are: Large groups of thin, hollow, interpenetrating cubes, the exterior coated with a dirty-white, sandy deposit. A group of very perfect, light brown cubes, the surfaces of which are prettily sprinkled with minute crystals of pyrite, and having in their hollow interior a delicate, snow-white, drusy mass of stalactitic quartz, upon which are two small crystals of chalcopyrite. A large group of cubes, sprinkled over with pyrite, with a large and very perfect 'slipper' pseudomorph projecting from them (Plate II, fig. 10). Large and very perfect, light brown cubes, prettily poised on a mass of chalybite-covered crystals of chalcopyrite and quartz.

As to the origin of these pseudomorphs there can be little or no doubt but that the original mineral was fluor.¹ William Jory Henwood, in fact, states that he was shown a specimen by a Captain Martyn, in which the cubes still retained that mineral.² Greg and Lettsom, although they refer to this or a similar specimen containing fluor, curiously enough suggest that pyrite was in most cases the original mineral.³ Mr. Edmund Pearse was of the same opinion, and in support of his view states that a multitude of cubic crystals of pyrite were found about six fathoms distant, but separated by solid rock.⁴ It is interesting to note that corroded cubes of fluor completely invested by chalybite have been found by the writer on the burrows of Devon and Courtenay Mine, Whitchurch, a mine situated about one mile north of Virtuous

¹ J. R. Blum, 'Die Pseudomorphosen des Mineralreichs,' 1863, Nachtrag 3, p. 250.

² W. J. Henwood, 'The Metalliferous Deposits of Cornwall and Devon,' Trans. Roy. Geol. Soc. Cornwall, 1843, vol. v, p. 140.

³ R. P. Greg and W. G. Lettsom, 'Manual of the Mineralogy of Great Britain and Ireland,' 1858, pp. 260-261. It is stated here in error that Virtuous Lady Mine and Bedford United Mine were identical.

⁴ Mrs. A. E. Bray, loc. cit., 1836, vol. iii, p. 259.

Lady. The writer also possesses a specimen recently found by his friend, Mr. Jehu Richards, on the burrows of Holmbush Mine, Stokeclimsland, Cornwall, showing a mass of cubic shells of chalybite, one of which contains a loosely fitting, much corroded blue cube of fluor 13 mm. along its edge. Similar, though less perfect, pseudomorphs of chalybite still retaining cubes of fluor also occur occasionally in the Boltsburn Mine, Weardale, Co. Durham. A specimen of this description in the writer's collection measures no less than 14 cm. along the edge.

The succession of events in the formation of the Virtuous Lady specimens has been pointed out by Sir Henry De la Beche,¹ and were as follows: firstly, the production of chalcopyrite, often crystallized in contact with the containing rock; secondly, the crystallization of some mineral in cubical forms, perhaps fluor; thirdly, the incrustation of these crystals by chalybite; fourthly, the dissolving of the fluor by some solvent which did not act on the chalybite; and fifthly, the crystallization of quartz and chalcopyrite in the cubical cavities thus formed. As Mr. F. W. Rudler² has pointed out, it must be admitted that it is difficult to understand the nature of the solvent which could remove fluor whilst leaving the chalybite unaltered. Carbonate of iron is formed by the action of alkaline carbonates on ferrous sulphate such as would result from the decomposition of pyrite, while alkaline carbonates decompose fluor with the formation of calcium carbonate.

The *pseudomorphs of chalybite after barytes* (Plate III, figs. 11-16) were found in considerable abundance at the same time, and in close proximity to the 'boxes,' and examples are to be found in most old collections. Inferior specimens in which the chalybite is partially converted by weathering into limonite may still be found on a small burrow on the central part of the mine. They consist of long, flat, tapering crystals, resembling in shape a gothic arch, and are composed of dark or light-brown chalybite in lenticular crystals, usually aggregated in more or less globular forms. They were known to the miners as 'Lady's Slippers,' and vary in length from 5 to 31 cm. Usually the chalybite has invested three sides only of the original barytes crystal, leaving a cast consisting of one flat face bounded by two narrow planes, the edges being as it were turned over by having numerous balls of chalybite upon them. The back or outside

¹ H. T. De la Beche, 'Report on the Geology of Cornwall, Devon, and West Somerset,' 1839, p. 391.

² F. W. Rudler, 'A handbook to a collection of the minerals of the British Islands, mostly selected from the Ludlam collection, in the Museum of Practical Geology,' 1905, pp. 69, 70.

of these crystals often consists of a thick coating of minutely crystallized pyrite, while the inside has its surface prettily sprinkled with small iridescent cubo-octahedra of the same mineral. In some cases the inner surface has upon it very regular, deep cubic impressions, and curious blotches of bright chalcopyrite, these being the under surface of crystals of chalcopyrite which must once have been attached to the parent barytes crystal. More rarely the chalybite has invested all four sides of the barytes crystals, thus forming very remarkable hollow pseudomorphs (Plate III, fig. 16), the walls of which are often not more than 1 mm. in thickness. Most of the specimens of this description show several superimposed individuals lying flat one upon the other, and graduated in size. In a good many cases one side or half of the pseudomorph has been more or less converted into yellowish-brown, gritty limonite. Mr. Edmund Pearse's collection contained a very fine series of these 'slipper' pseudomorphs, amongst which may be mentioned: very large groups intergrown and crossing one another in a curious manner; a large group of 'box' pseudomorphs having 'slipper' pseudomorphs projecting from them (Plate II, fig. 10); a group of three parallel 'slippers,' their exterior being entirely encrusted with brilliant brassy-yellow pyrite crystals. Very rarely the 'slipper' pseudomorphs are doubly terminated. One in the Pearse collection measures 13 cm. in length, and is especially mentioned as a rarity in the letter to Mrs. Bray.¹ It is hollow, of a light brown colour, and sprinkled over with small octahedrons of pyrite (Plate III, fig. 15).

Owing to the curvature and roughness of the faces it has been found impossible to determine accurately the forms which have given rise to this particular habit. Some of the larger pseudomorphs consisting of three sides only, have, however, on the inner side counter-sunk impressions of smaller crystals of similar habit and of sharper outline, and from these it was possible to determine roughly the acute angle, which was found to be about $56^{\circ} 36'$, thus suggesting the form $g \{10\bar{3}\}$ ($gg' = 56^{\circ} 29'$) of barytes in conjunction with $b \{010\}$ and $c \{001\}$. As to barytes having been the original mineral there can, I think, be little doubt. Greg and Lettsom suggest selenite (gypsum), but it is obvious that this was not the case, the habit being entirely dissimilar. The specimen referred to above on which 'slipper' pseudomorphs project from a group of 'box' pseudomorphs recalls the association of barytes crystals and large cubes of fluor from the lead lode of Wheal Mary Ann, Menheniot, Cornwall. The habit of the Wheal Mary Ann

¹ Mrs. A. E. Bray, loc. cit., 1836, vol. iii, p. 259.

barytes is, however, quite unlike that of the pseudomorphs from Virtuous Lady, and one cannot in fact recall any crystals of barytes of a similar type and size. The Pearse collection contains an interesting specimen from the Old Beer Mine (South Tamar Consols), Beer Ferris, consisting of a group of pseudomorphs of apparently exactly similar habit to the Virtuous Lady 'slippers'; they average about 3 cm. in length. In this case the barytes crystals have been entirely substituted by galena, upon which is sprinkled a little pyrite, and numerous rhombs of dolomite; the pseudomorphs being implanted on cubic fluor. Pseudomorphs of quartz after barytes of exactly similar habit 4 cm. in length have also been found by the writer on the old burrows of Great Work Mine, Breage, Cornwall. Greg and Lettsom state that chalybite in 'slipper' pseudomorphs occurred also at Beeralston, and Wheal Friendship, Mary Tavy¹; there is, however, considerable doubt concerning the accuracy of this statement. As to the nature of the solvent which attacked the original barytes, one is confronted with the same difficulty which arises in considering the formation of the 'box' pseudomorphs; it seems, however, pretty evident that the solvent was identical in both cases, and that the action took place at the same period.

CHLORITE.

Chlorite (prochlorite) was especially abundant in this mine; it occurred in soft, greyish-green masses, composed of minute scaly aggregates, which in the cavities form crystalline rosettes. It often contains embedded crystals of pyrite and anatase.

SPHENE.

Greg and Lettsom state that sphene occurred here in small, yellowish crystals in chlorite.² The writer has, however, been unable to confirm this occurrence.

SCORODITE.

Specimens of scorodite have been found by the writer on the old burrows. The mineral forms a light-green, mamillary crust on massive, white quartz, and probably results from the alteration of mispickel.

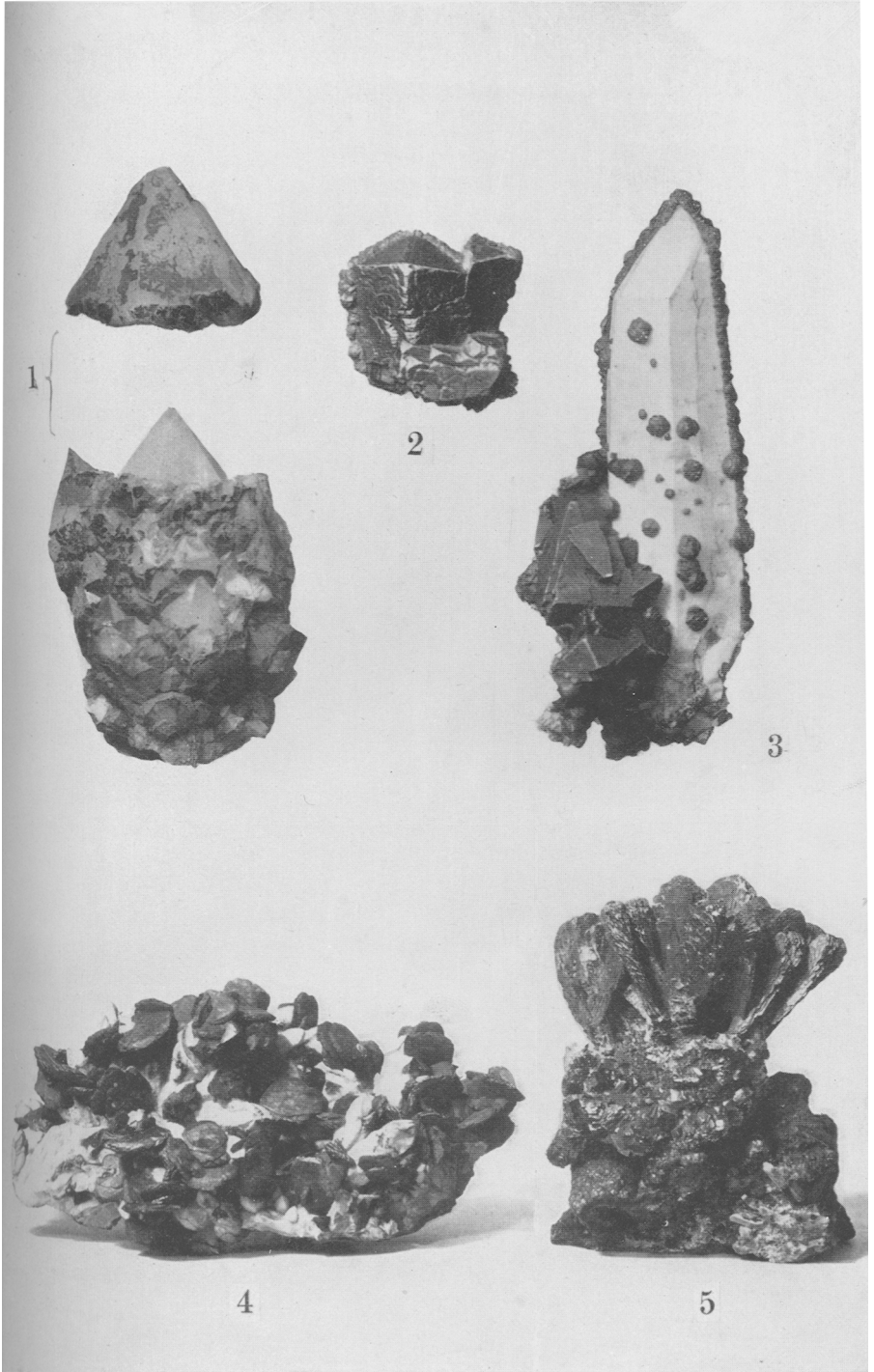
¹ R. P. Greg and W. G. Lettsom, loc. cit., p. 260.

² Ibid., p. 368.

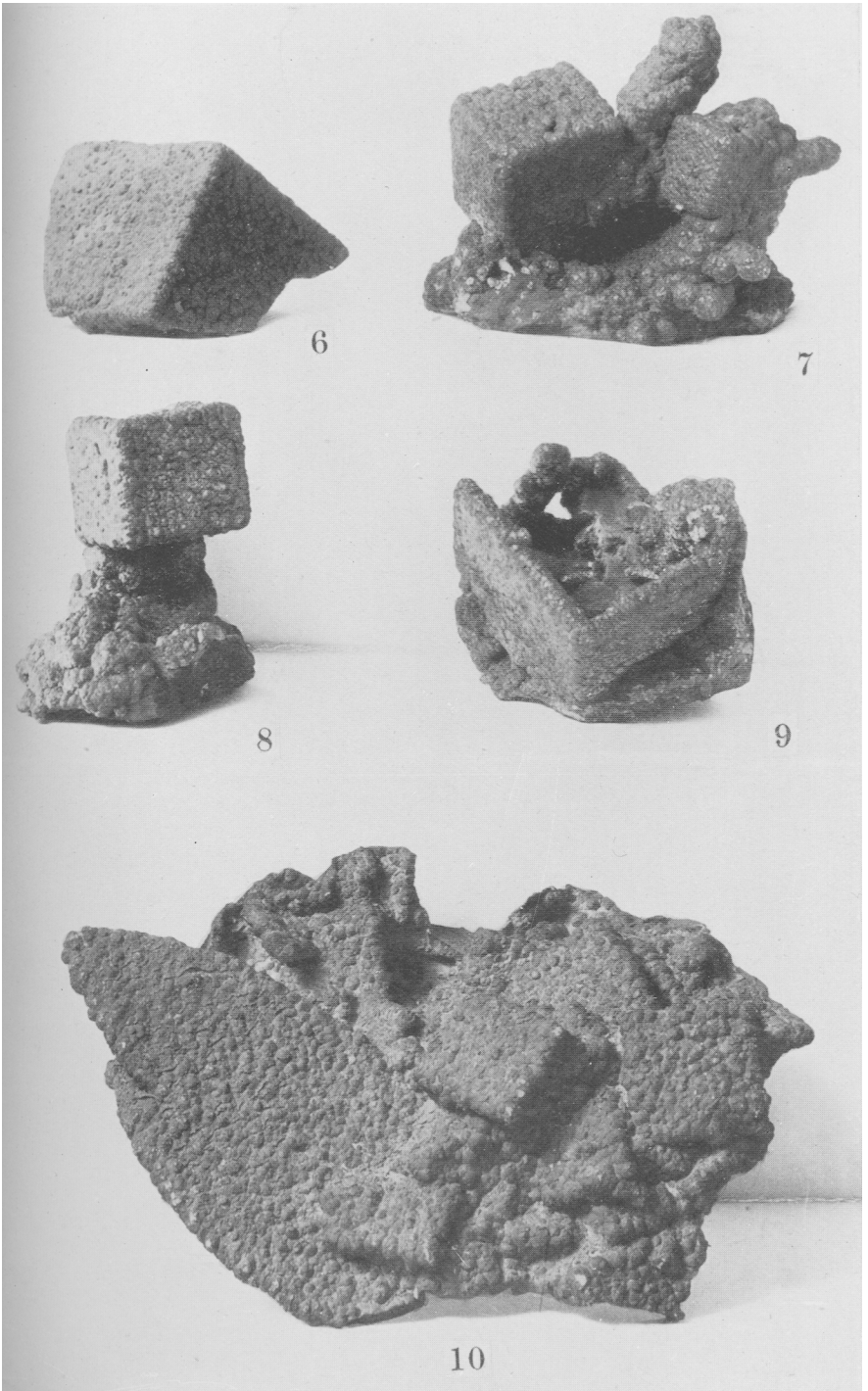
EXPLANATION OF PLATES I-III.

(Photographs of mineral specimens from Virtuous Lady Mine, Tavistock, Devonshire, in the writer's collection.)

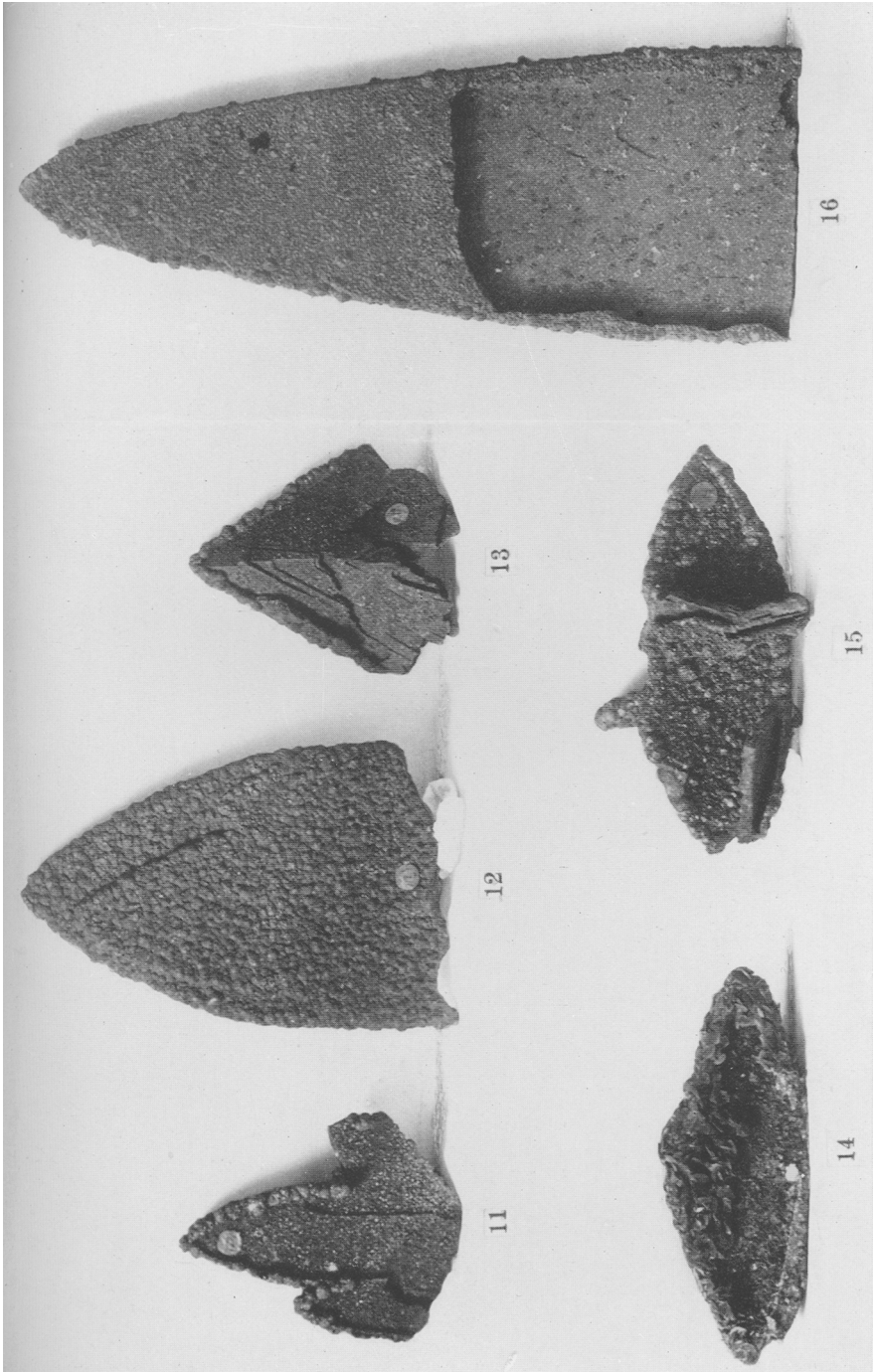
- Fig. 1. Capped quartz, with the cap detached : actual size 13 × 8 cm.
 ,, 2. Mispickel crystals partially coated with chalybite : actual size 4 × 5 cm.
 ,, 3. Mispickel crystals and balls of chalybite on quartz : actual size $13\frac{1}{2} \times 6$ cm.
 ,, 4. Disc-like crystals of chalybite on quartz crystals : actual size 14 × 9 cm.
 ,, 5. Marcasite in fan-shaped groups, on cubes of pyrite resting upon chalybite : actual size 10 × 8 cm.
 ,, 6. Pseudomorph of chalybite after fluor : actual size 7 × 8 cm.
 ,, 7. A group of pseudomorphs of chalybite after fluor with chalybite-covered quartz crystals, upon chalcopyrite : actual size 12 × 11 cm.
 ,, 8. Pseudomorph of chalybite after fluor : actual size 9 × 9 cm.
 ,, 9. Pseudomorph of chalybite after fluor, the interior containing beautiful iridescent sphenoids of chalcopyrite and small, opaque white quartz crystals : actual size 7 × 7 cm.
 ,, 10. A group of pseudomorphs of chalybite after fluor with pseudomorphs of chalybite after barytes projecting from them : actual size 22 × 23 cm.
 ,, 11. A group of three parallel pseudomorphs of chalybite after barytes, sprinkled over with small, brilliant crystals of pyrite : actual size $9\frac{1}{2} \times 8$ cm.
 ,, 12. A pseudomorph of chalybite after barytes, the under side being entirely encrusted with pyrite : actual size 15 × 10 cm.
 ,, 13. Two pseudomorphs of chalybite after barytes, curiously intergrown, and sprinkled with small crystals of pyrite : actual size $9\frac{1}{2} \times 8$ cm.
 ,, 14. A pseudomorph of chalybite after barytes, doubly terminated and showing an open interior : actual size $13 \times 4\frac{3}{4}$ cm.
 ,, 15. A similar pseudomorph with a hollow interior, and other smaller pseudomorphs projecting from it : actual size $13\frac{1}{2} \times 4\frac{3}{4}$ cm.
 ,, 16. A large pseudomorph of chalybite after barytes, showing the hollow interior : actual size 26 × 10 cm.



ARTHUR RUSSELL: MINERALS FROM THE VIRTUOUS LADY MINE TAVISTOCK.



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