



Mineral Resources Tasmania

REPORT 1993/21

Mineralogical examination of some mineral samples from Tasmania, for the Tasmanian Museum and Art Gallery

by R. S. Bottrill and R. N. Woolley

The following samples, from the Petterd collection held by the Tasmanian Museum and Art Gallery, Hobart, were examined to confirm the presence of several rare minerals reported in Tasmania (Department of Mines, 1970). The samples were examined stereomicroscopically and by X-ray diffraction (XRD, with a Philips PW 1710/PW 1050 automated X-ray powder diffractometer). The results of these examinations are given below.

X160: "Native lead, Mt Dundas, Tasmania"

This sample is grey and irregular to dendritic, and partly decomposed. XRD indicated only litharge and minor hydrocerussite, but the sample is slightly malleable and there is probably lead metal present in its core. There is no matrix, and it is not possible to confirm the natural occurrence of the sample.

X624: "Matlockite on galena, Magnet, Tasmania"

This sample was not tested by XRD due to the small number of crystals present. It does, however, greatly resemble matlockite from the type locality (Matlock, England: Burr, 1992). The matrix is also unusual for the stated locality (Magnet mine), with possible fluorite present. If it is from the type locality it would still be a very valuable specimen.

X865: "Minium, White River, Tasmania"

This sample is a white, shaly-looking rock with a bright red ochreous coating. The red coating contains, in approximate order of abundance: quartz, hematite, chlorite, goethite and illite. The red colour is presumably due to hematite; there is no indication of any lead minerals present. Minium is probably not a true mineral at any rate, usually being a result of mine fires or other man-made intervention.

X1114: "Phosgenite, Magnet, Tasmania"

This sample is of partly oxidised lead ore. The matrix is mostly coarse-grained galena, partly leached and coated in places with black, non-crystalline (?)manganiferous oxides (unidentified). There is a large cavity partly filled with coarse-grained, crystallised cerussite, from clear to white in colour, with crystals up to 40 mm in size. Upon this cerussite sits one well-formed, blocky, semi-transparent to smoky-brown crystal. This crystal does closely resemble

phosgenite in appearance, but was not tested due to its high quality. The cerussite was confirmed by XRD.

X1115: "Phosgenite, Dundas, Tasmania"

This sample varies from white to a moderate purplish brown in colour. It is largely a coarse-grained crystalline aggregate, with crystals in vughs varying from bladed to fibrous aggregates. Much of the sample is smooth and etched or waterworn, and there is a partial red-brown limonitic coating on some crystals. XRD indicates the sample to be cerussite.

X1116: "Phosgenite, Magnet, Tasmania"

The sample actually consists of two quite different specimens. One (Specimen A) contains a large grey, glassy, blocky, partly broken crystal in a cavity in fine-grained, massive galena, with some massive to crystallised cerussite. XRD indicates the large crystal to be phosgenite, but possibly with an expanded lattice.

Specimen B contains bands of hard, porous, limonitic brown gossan; granular, sulphidic, white to creamy coloured carbonate (dolomite?); coarsely crystalline galena; and white to brown crystals (to a few millimetres). XRD indicates the presence of sphalerite, mimetite and siderite in the crystal crusts. The mimetite varies from white or colourless to a deep red-brown, the colouration probably largely resulting from the associated sphalerite and/or limonite, and crystals are hexagonal prisms and pinacoids with minor bipyramids.

X1970: "Carminite, Magnet, Waratah, Tasmania"

This sample has a porous, vughy matrix of yellow-orange powdery limonite, with scattered white quartz as blebs and small crystals. Cavities contain fine drusy red to yellow crystals to about one millimetre in size. Some of these are simple hexagonal prisms of mimetite, varying from pale yellow and transparent to opaque and red in colour. Coating the mimetite, limonite and quartz are finer, bladed, opaque red "shark's tooth" crystals of crocoite. XRD confirmed the presence of mimetite, quartz and crocoite.

X1972: "Carminite, Magnet, Waratah, Tasmania"

This sample contains a sprinkling of fine red needles on a brown matrix. The crystals are mostly simple hexagonal

prism-pinacoid combinations, and XRD indicates they are mimetite with some minor admixed crocoite. The powdery brown matrix consists of chalcophanite, pyrolusite and goethite.

X2161: "Vauquelinite, Tasmania"

This sample contains quartz-sulphide (?chalcopyrite, etc.) ore with a poorly crystalline yellow-green coating. XRD indicates that the coating comprises anglesite and a jarosite or beudantite-type mineral. Cuprite and antlerite also appear to be present, but were not confirmed. The old label appears to read: *Vauquelinite, Queen of the Earth, Scamander River.*

X2167: "Leadhillite, Heazlewood River, Tasmania"

This sample consist of a slab of coarsely crystalline galena, partially oxidised. The galena is partly coated by fine-grained white cerussite, overlain by yellow-brown limonite, and on this limonite is growing a crust of fine to coarse, well formed, off-white crystals. XRD indicated that the white crystals are anglesite. Some fine cerussite crystals also occur on the base of this specimen.

X2266: "Wulfenite, Emu River, Tasmania"

This sample contains fine blocky orange crystals on a white schistose matrix. It was not tested by XRD but it looks almost identical to wulfenite recorded from the Broken Hill Mines, NSW, an origin supported by the presence of blue quartz and pink garnets in the matrix (Birch *et al.*, 1982).

X3799: "Massicot, Dundas, Tasmania"

This sample actually consists of three quite different specimens, and the following minerals were confirmed by XRD.

Specimen A: The major part of the sample, contains powdery yellow bindheimite and minor brown goethite, both non crystalline and massive.

Specimen B: Contains mostly yellow to orange to green powdery to resinous sulphur, varying from botryoidal to dendritic to finely crystallised. Some small red sulphur globules occur, and some small clear crystals of arsenolite also occur on the sample. These secondary minerals appear to overgrow a matrix rich in pyrite and chalcopyrite.

Specimen C: This is a sample of partly oxidised lead ore, with coarse-grained galena coated by rims of white cerussite, red-orange crocoite and yellow-brown mimetite in turn. All of the secondary minerals are fine grained or poorly crystallised.

SUMMARY

The supposed presence of many minerals in Tasmania is based largely upon the identifications of Petterd (1910). If the specimens described above, originating from his collections, are truly representative, the existence of many mineral species in Tasmania must be regarded as very doubtful. Some of the above examples are mis-identifications, and some are possibly exotic samples, mis-identified as Tasmanian. From this study alone, the existence of massicot, minium, leadhillite, vauquelinite,

carminite, matlockite and wulfenite in Tasmania must be regarded as in need of further confirmation. Searches through other collections and various mine dumps have failed to locate any of these species, although the right association of elements commonly exists. Phosgenite has also been confirmed at Dundas by Martin Crane (*The Earth Exchange*, Sydney; pers. comm.).

BIBLIOGRAPHY

BIRCH, W. D., CHAPMAN, A.; PECOVER, S. R. 1982. *The Minerals, in: WORNER, H. K.; MITCHELL, R. W. (ed.). Minerals of Broken Hill.* Australian Mining and Smelting Ltd, Melbourne.

BURR, P. S. 1992. Notes on the history of phosgenite and matlockite from Matlock, England. *Mineralogical Record*. 23:377-386.

DEPARTMENT OF MINES, 1970. *Catalogue of the minerals of Tasmania.* Department of Mines, Tasmania.

PETTERD, W. H. 1910. *Catalogue of the minerals of Tasmania.* Department of Mines, Tasmania.

GLOSSARY OF MINERALS

Anglesite:	PbSO ₄
Antlerite:	Cu ₃ (SO ₄)(OH) ₄ (green)
Arsenolite:	As ₂ O ₃
Beudantite:	PbFe ₃ (SO ₄)(AsO ₄)(OH) ₆ (green)
Bindheimite:	Pb ₂ Sb ₂ O ₆ (O,OH) (yellow)
Carminite:	PbFe ₂ (AsO ₄) ₂ (OH) ₂ (red)
Cerussite:	PbCO ₃
Chalcophanite:	(Zn, Fe", Mn")Mn ³⁺ 3O ₇ .3H ₂ O
Chalcopyrite:	CuFeS ₂
Crocoite:	PbCrO ₄ (red)
Cuprite:	Cu ₂ O (red)
Dolomite:	CaMg(CO ₃) ₂
Galena:	PbS
Goethite:	FeO(OH) (brown)
Jarosite:	KFe ₃ (SO ₄) ₂ (OH) ₆ (yellow)
Leadhillite:	Pb ₄ (SO ₄)(CO ₃) ₂ (OH) ₂
Litharge:	PbO (red)
Massicot:	PbO (yellow)
Matlockite:	PbFCl
Mimetite:	Pb ₅ (AsO ₄) ₃ Cl
Minium:	Pb ₃ O ₄ (red)
Phosgenite:	Pb ₂ (CO ₃)Cl ₂
Pyrite:	FeS ₂ (black-brassy)
Pyrolusite:	MnO ₂ (brown-black)
Siderite:	FeCO ₃
Sphalerite:	ZnS
Sulphur:	S (yellow)
Vauquelinite:	Pb ₂ Cu(CrO ₄)(PO ₄)(OH) (green)
Wulfenite:	PbMoO ₄ (red-yellow)

[16 August 1993]