and Kelly, 1964; Mann, 1984; Stoffregan, 1986) that gold is mobile as a chloride complex. The gold at Botallack may well represent an enrichment by such a process.

Acknowledgements. To C. J. Stanley and R. S. Scrivener for information on the distribution of gold in south-west England, and to J. F. W. Bowles for reviewing the note.

References

Andrew, R. L. (1980) Supergene alteration and gossan textures of base-metal ores in Southern Africa. *Mineral Sci. Eng.*, **12**, 193–215.

Bowell, R. J. (in press) Supergene copper mineral assemblages at Botallack, Cornwall. *J. Russell Soc.*

Clark, A. M. and Criddle A. J. (1982) Palladium minerals from Hope's Nose, Torquay, Devon. *Mineral. Mag.*, **46**, 371–7.

Clayton, R. E., Scrivener, R. C., and Stanley, C. J. (1990) Mineralogical and preliminary fluid inclusion studies of lead-antimony mineralization in North Cornwall. *Proc. Ussher. Soc.*, **7**, 258–62.

Cloke, P. L. and Kelly, W. C. (1964) Solubility of gold under inorganic supergene conditions. *Econ. Geol.*, **59**, 259–70.

Dewey, H. (1923) Copper ores of Cornwall and Devon. *Memoirs of the Geological Survey of Great Britain.* Mineral Resources 1, London.

Dines, H. G. (1956) *The metalliferous mining region of South-West England.* (2 vols) London (H.M.S.O.).

Mann, A. W. (1984) Mobility of gold and silver in lateritic weathering profiles: some observations from Western Australia. *Econ. Geol.*, **79**, 38–49.

Russell, A. (1944) Notes on some minerals either rare or new to Britain. *Mineral. Mag.*, **28**, 1–10.

Stanley, C. J., Halls, C., Camm, G. S., and James, J. (1990*a*) Gold–antimony mineralization Loddiswell, Devon, UK. *Terra Nova*, **2**, 224–31.

—— Criddle, A. J., and Lloyd, D. (1990*b*) Precious and base-metal selenide mineralization at Hope's Nose, Torquay, Devon. *Mineral. Mag.*, **54**, 485–93.

Stoffregan, R. (1986) Some observations on the behaviour of gold during supergene oxidation at Summitville, Colorado, USA, and implications for electrum stability in the weathering environment. *Appl. Geochem.*, **1**, 549–58.

KEYWORDS: gold, Botallack mine, Cornwall.

R. J. BOWELL

Dept. of Geology, The University, Southampton SO9 5NH
Now at *Dept. of Mineralogy, The Natural History Museum, London SW7 5BD*

[*Manuscript received 4 February 1991;*
revised 4 March 1991]

Andersonite and schröckingerite from Geevor mine, Cornwall: two species new to Britain

SCHRÖCKINGERITE, $NaCa_3(UO_2)(CO_3)_3(SO_4)F.10H_2O$, is the most abundant of the uranyl carbonates and is of relatively widespread occurrence. It was first found at Joachimsthal, Czechoslovakia, as an alteration product of uraninite (Schraúf, 1873). It is found at numerous locations in the U.S.A., notably Wamsutter, Wyoming, Yavapai County, Arizona and several localities in Utah (Hurlbut, 1954; Frondel, 1958); it has even been mined as the primary ore in a few small deposits (Smith, 1984). Schröckingerite has also been reported from eastern Germany, Austria and Argentina (Frondel, 1958). In most of the deposits the habit is similar, described as globular aggregates of minute scales; distinct crystals to around one millimetre have also been reported (Hurlbut, 1954).

Andersonite, $Na_2Ca(UO_2)(CO_3)_3.6H_2O$, was first described by Axelrod *et al.* (1951) from specimens collected at the Hillside Mine, Yavapai County, Arizona, where it occurred as clusters of minute pseudo-cubic crystals, associated with gypsum, schröckingerite, bayleite and schwartzite. The mineral has subsequently been reported from other localities in the U.S.A., notably Grand County, New Mexico and San Juan County, Utah where it occurs as rhombohedral crystals to around 12 mm (Frondel, 1958; Roberts *et al.*, 1990).

Both andersonite and schröckingerite have now been found at the Geevor mine, Pendeen, Cornwall, where they occur on the walls of a drive along the Peeth Lode on 17 Level (1700 feet below surface). This is the first recorded occurrence of these species in Britain.

Most of the schröckingerite and andersonite is restricted to one part of the drive with a linear extent of approximately 4 metres. In this area the schröckingerite occurs as small greenish-yellow spheroidal globules, up to 4 mm in diameter, widely scattered over the tunnel wall. Specimens of this material were first brought to the authors' attention by Mr E. Gale of Geevor Tin Mines plc. Superficially, the (unbroken) globules appear featureless, but closer examination reveals them to be composed of aggregates of tiny, euhedral, pseudo-hexagonal plates (typically around 50 μm across, occasionally to 0.2 mm). Some appear to be cemented together by gypsum over the outer surface. This habit is similar to that recorded in other deposits (Hurlbut, 1954). The samples exhibit a strong yellowish-green fluorescence, which produces a remarkable display *in situ* on the tunnel walls.

The andersonite is much less common. It occurs as small masses of intergrown, pseudocubic crystals to 3 mm on edge. The crystals are transparent and of a bright yellow–green colour, and exhibit very bright yellow–green fluorescence under long-wave UV light, similar in colour and intensity to that of the schröckingerite aggregates.

The walls of the drive are composed of granite traversed by quartz veinstone carrying minor sulphides. However, much of the tunnel wall is coated with a friable, sandy material, cemented to the underlying rock by gypsum, and the schröckingerite and andersonite are commonly found on this substrate.

Identification of the schröckingerite was carried out by X-ray powder diffractometery. The XRD analysis showed the aggregates to be composed of a mixture of gypsum and schröckingerite. The andersonite was tentatively identified as such following examination by energy-dispersive X-ray analysis. Both schröckingerite and andersonite were subsequently confirmed by X-ray powder diffraction at the British Museum (Natural History) (film numbers 8567F and 8568F respectively).

The andersonite and schröckingerite occur in close association with each other at Geevor. In a few specimens, schröckingerite-gypsum aggregates are observed partially intergrown with andersonite. Other secondary uranium mineralisation occurs along the Peeth Lode. Yellow zippeite-type secondaries are widespread along the tunnel walls. Johannite is also found in the same area and specimens in the possession of the British Museum (Natural History), collected from this location in 1986/87, are associated with a mineral tentatively identified as becquerelite (P. C. Tandy and J. G. Francis, pers. comm.). However, these species are rarely seen in close association with the andersonite and schröckingerite.

Samples of the andersonite and schröckingerite have been lodged with the British Museum (Natural History) and the University Museum, Oxford.

Acknowledgements. The authors wish to thank R. F. Symes, P. C. Tandy and J. G. Francis of the British Museum (Natural History) for useful discussions and the X-ray powder photography. The authors are also grateful to ECC International for the use of analytical instrumentation.

References

Axelrod, J. M., Grimaldi, F. S., Milton, C., and Murata, K. J. (1951) *Am. Mineral.*, **36**, 1.

Frondel, C. (1958) *USGS Bull.*, **1064**, 115.

Hurlbut, C. S. (1954) *Am. Mineral.*, **39**, 901.

Roberts, W. L., Campbell, T. J., and Rapp, G. R. Jr. (1990) *Encyclopedia of Minerals*, 2nd Edition (Van Nostrand Reinhold, New York).

Schrauf, A. (1873) *Min. Mitt.* no II, 137 [Source: Hurlbut (1954)].

Smith, D. K. Jr. (1984) Uranium Mineralogy. In *Uranium Geochemistry, Mineralogy, Geology, Exploration and Resources* (De Vivo, B. *et al.*, eds) Institution of Mining and Metallurgy.

KEYWORDS: schröckingerite, andersonite, Geevor mine, Cornwall.

N. J. ELTON

Tregears, Little Treviscoe, St Austell, Cornwall PL26 7QL.

J. J. HOOPER

48 St Julitta, Luxulyan, Bodmin, Cornwall PL30 5ED

[*Manuscript received 12 July 1991*]

Mineral nomenclature: sulrhodite

THE crystal structure of synthetic Rh_2S_3 was described by Parthé *et al.* (1967) in space group *Pbcn* (60) with *a* 8.462, *b* 5.985, *c* 6.138 Å and Z = 4, to a R value of 0.069. The Rh atoms occupy a single set of eight atomic positions.

Bowieite $(Rh, Ir)_2S_3$ described by Desborough and Criddle (1984) has *a* 8.454, *b* 6.002 and *c* 6.121 Å in space group *Pbcn* (60). Bowieite was submitted to the International Mineralogical Association Commission on New Minerals and Mineral Names (CNMMN) on 14 March, 1980. The records show that it was approved (20-0 for the mineral, 19-0-1 abstention for the name) in the CNMMN memorandum dated 21 June, 1980. The delay between approval and publication occasioned by a great deal of extra work on the composition and optics was sanctioned by CNMMN.

Sulrhodite Rh_2S_3 described by Keqiao *et al.* (1983) has *b* 8.493, *c* 5.987 and *a* 6.167Å in space group *Pnca* (60) similar to PDF 21-1017. The paper was received by *Kexue Tangbao* on July 29, 1981; however, sulrhodite was never submitted to the CNMMN.

The two minerals have an identical end-member formula of Rh_2S_3 and identical crystal structure. Based upon the rule of priority, bowie-