



# Billeroo Davidite

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Billeroo is the name of a hill, a dilapidated corrugated iron hut sitting at its base and an old copper mine, some 20 km north east of the Plumbago Station homestead – 50 km north of Mannahill, South Australia.

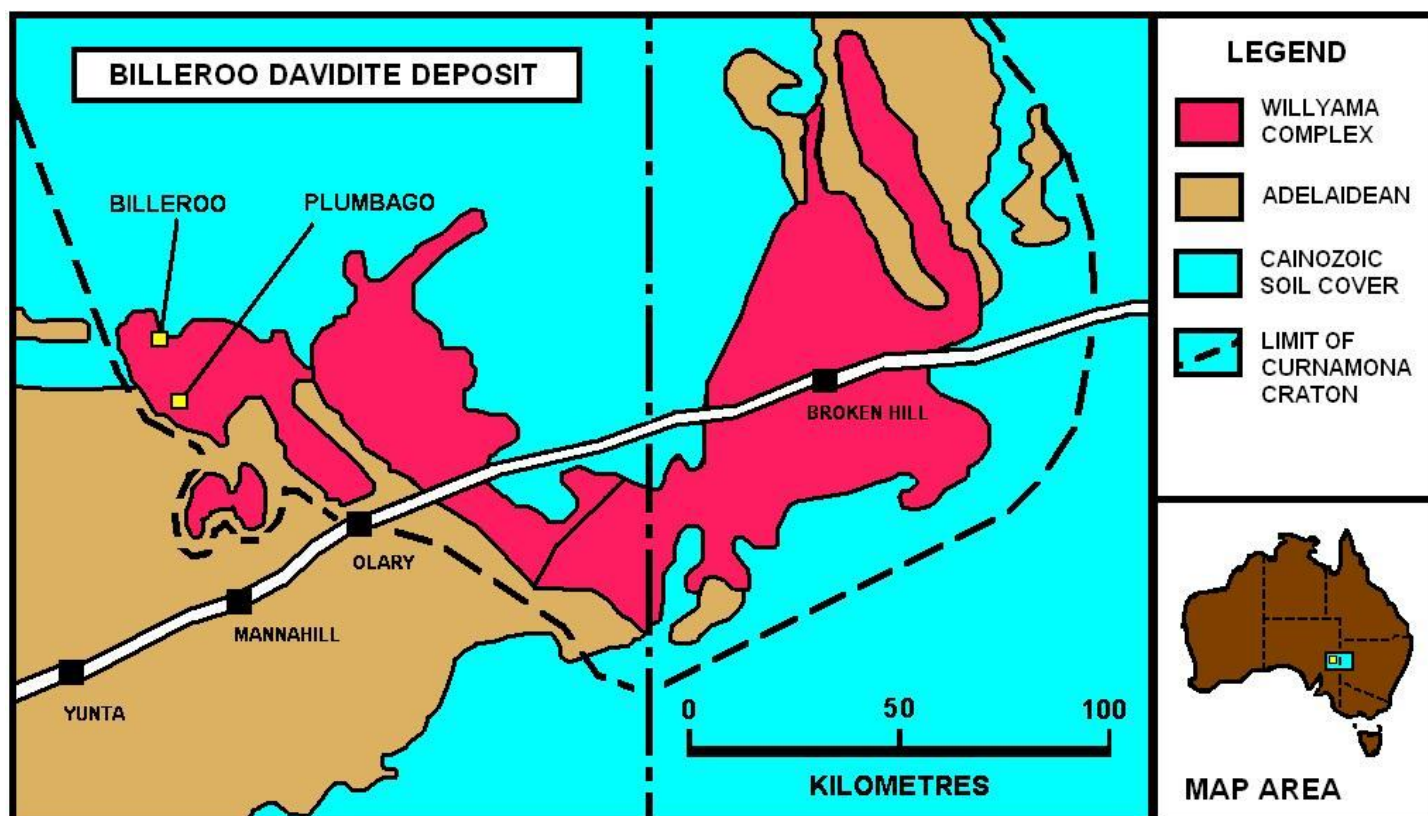
The Plumbago area includes the north-western end of the Olary Block which itself along with the Broken Hill Block form an ancient geological province called the Willyama Complex. This along with the Mount Painter Complex are the remaining outcropping rocks of a much larger and mineral rich geological region known as the Curnamona Craton.

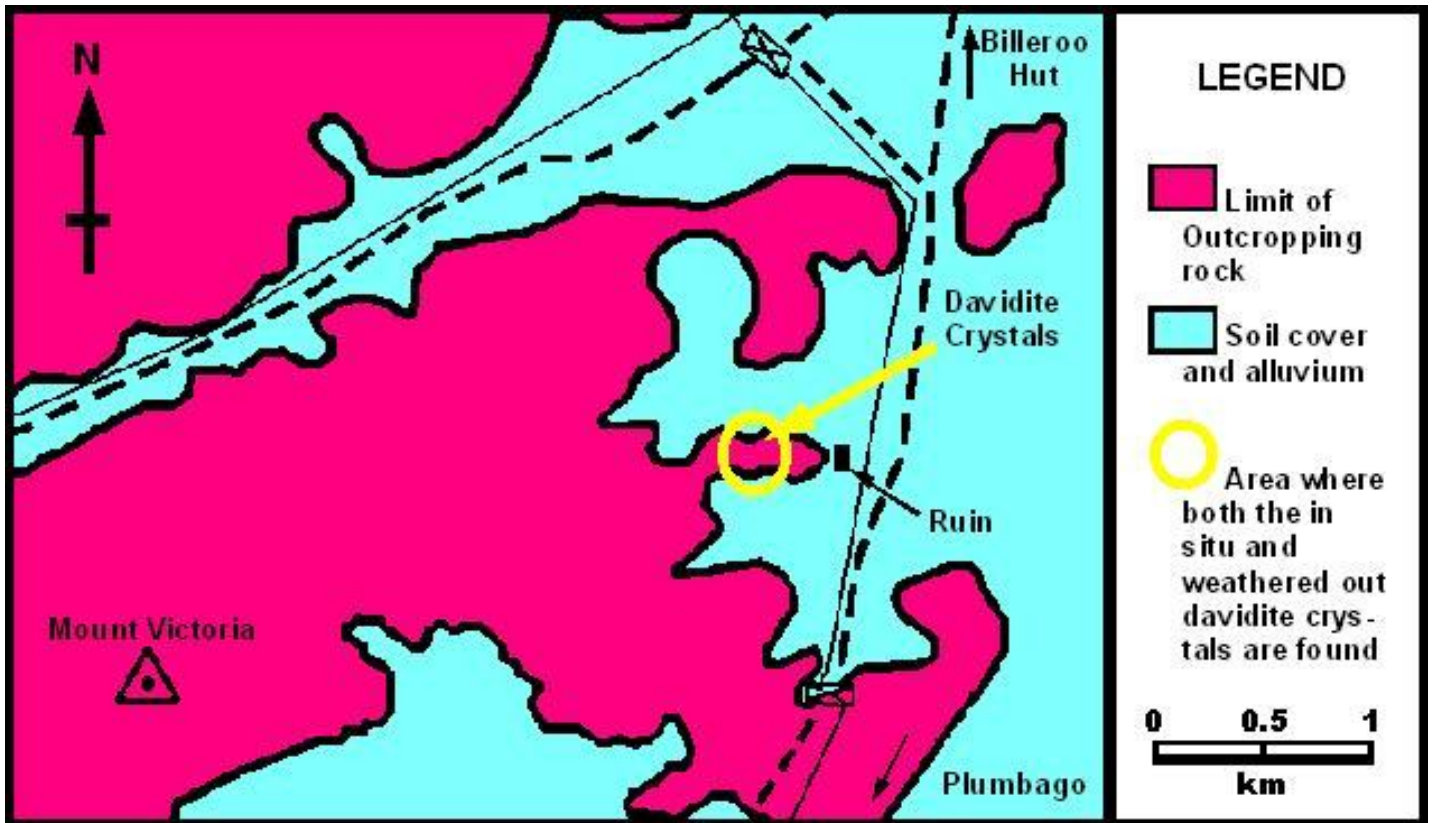
The Curnamona Craton contains a sequence of high-grade metamorphic rocks, primarily schists and gneisses with accompanying amphibolites and calc-silicates. In association with these metamorphic rocks there are numerous igneous bodies and these are most prominent in the Plumbago area. The highest point on Plumbago Station is Mount Victoria, a large granite massif riddled with cross cutting pegmatites. These pegmatites contain a number of uranium and rare earth minerals including xenotime, monazite, ilmenorutile, brannerite and of course davidite. The Billeroo davidite deposits lie on the eastern end of the Mount Victoria granite massif.

Davidite was first described by Sir Douglas Mawson after he discovered a new radioactive mineral at Radium Hill, 20 km southeast of Olary. He identified and named Davidite in honour of his friend and mentor, Sir Tannatt William Edgeworth David. The mineral has since been identified at other locations around the world, however occurrences of the lanthanum rich variety are almost exclusive to the Olary district of South Australia. Most of the Olary district davidite occurrences exist as either small blebs in the rock – such as at the Mount Victoria Uranium Mine or as massive vein filling lumps – such as at Radium Hill.

The Billeroo prospect was discovered by J. E. (Jim) Johnson during his extensive mapping work for Campana and King in the 1950's. It is noted in their 1958 publication – Bulletin No. 34 – Regional Geology and Mineral Resources of the Olary Province, that well developed crystals of davidite were found at location C.W. 164. The prospect turned out to be unique within the area and is now noted as the best location in the world for large crystalline masses of davidite.

I had first heard about this location when talking to Mr Patrick Murphy – a well known South Australian mineral collector – while I was at university, some





twenty years ago. He had said that there were good davidite crystals in a gully draining a hill at Billeroo, however he could not remember which hill it was, only that it was west of the track before you came to the hut. Very few people who had visited the location were still around to give assistance, including the discoverer, who had passed away a few years earlier. I acquired a copy of Campana and King and studied every detail and accompanying map but it would be fifteen years before the opportunity arose and the Broken Hill Mineral Club would visit Plumbago. The decision was made to try and rediscover the location based on the outcrop geology and mineral location map from Campana and King. A stroke of luck, that a map of the station showing fencelines and gates, was hanging up in the mess hall at the shearer's quarters. This allowed us to transpose these features onto our map and give more accurate directions. This was to become the first of three visits to the site over the next five years. The latest of these in September 2007 was a joint visit with the Broken Hill Mineral Club, the Flinders Gem and Mineral Club and The South Australian Mineralogical Society. On this excursion we had the privilege to be accompanied by Mr Don McColl, who was one of the few remaining persons that had been to the location forty years earlier with Jim Johnson.

The davidite zone occurs in a saddle on a low ridge approximately 6.5 km southwest of the Billeroo Hut and 13.5 km north of the Plumbago homestead. The saddle is 300 metres west of the Plumbago – Billeroo Hut track at a point where it comes in close proximity to a paddock boundary fence. The ruins of a shep-

herds hut's chimney stack – the key landmark – stands at the southeast corner of the ridge and around 50 metres from the fence.

The davidite crystals occur in quartz veins that cut through the granitic rock. The veins range from 1 – 10 cm in width and crystals have shed out of these down both sides of the ridge. The northern flank has the best formed and better shaped crystals while the southern flank has larger lesser well formed lumps with crystal faces. All through the scree down both flanks are numerous pieces of broken crystalline davidite. On top of the ridge is a level area containing soil to a depth of 20 – 30 cm, that when sieved or scraped can yield excellent well formed crystals up to 3 – 4 cm in size.

The crystals themselves form as pseudo-octahedral and cubic masses or as thick rounded tabular plates. The octahedral crystals being the preferred samples for the collector. The detrital samples are black or dark brown and have a metallic sheen when broken, while those found close to or in-situ have a reddish coating. There are a number of quartz veins crossing the top of the hill and these have yielded some very nice matrix pieces.

For the mineral collector this is a great spot to obtain that unique and unusual specimen, for davidite is quite a rare mineral and good crystalline samples are rarer still. At this location, not only are the davidites in crystal form but they are uncommonly large. The future however, of collecting davidites at Billeroo is in some doubt. While there are still plenty of

crystals to be found over the flank of the hill or shallowly buried in the topsoil, access to the location may soon be restricted. There has been renewed interest by mining companies in the old uranium deposits throughout the Olary region and this location has been identified as having potential. If the area is mined in the future some museum quality crystals and clusters will hopefully be preserved, otherwise for those who already have a specimen from this location, consider yourself lucky to have such a unique piece in your collection.



References:

Campana B. and King D. 1958. Regional Geology and Mineral Resources of the Olary Province. *Geological Survey of South Australia. Bulletin No. 34*

Noble R.J, Just J and Johnson J.E. 1983. Catalogue of South Australian Minerals – 1983. *Department of Mines and Energy. Handbook No. 7*



**Pictures** - Clockwise from top

Close up of quartz vein showing well formed in situ crystals. Field of view is 15 cm – largest crystal is 2cm across.

Matrix cluster of well formed davidite crystals. Specimen found by member of South Australian Minsoc.

Single crystals of davidite, largest is 30mm across.

Members of the Flinders Gem and Mineral Club using the “dartomatic” shaker table sieve to extract crystals from the soil at the top of the ridge

