

The second speaker for the evening was David Colchester who was to speak on the Burra Copper Mine in South Australia which was the largest mine in this country for the peak period of its operations. The speaker has provided notes on his lecture as follows.

BURRA. THE MINE AND THE TOWN By David Colchester

In response to a suggestion that more talks on historical subjects should be presented at Society meetings it was suggested that I give a talk on the Burra copper mine and the township of Burra because I had lived in the town and had worked in the surrounding area. As you all know the Burra copper mine is well known to mineral collectors for its beautiful malachite and azurite specimens.

The history of the Burra copper mine and the township of Burra has been extensively documented in the print literature notably by Ian Auhl who was at one time the principal of the Burra Primary School. The history of the mine and the town is also well reviewed on the Internet.

The Burra copper deposits are located 160 km north of Adelaide and lie within a major structural unit called the Adelaide Fold Belt. This fold belt consists of folded and faulted rocks of Upper Proterozoic age and they form the Mount Lofty Ranges to the south and the Flinders Ranges to the north. An interesting feature of the Adelaide fold belt is the presence of numerous diapirs. These are regions of intensely folded and fractured rocks and they usually occur in the cores of the folds and are often associated with mineralization.

You may find it interesting to know that Burra creek which flows through Burra township was once part of the Murray River system which used to cross the Northern Mount Lofty Ranges through the Burra creek gorge and then out to Spencer Gulf. The Murray River was diverted south at Morgan during Eocene times, about 50 million years ago by fault movements and uplifting of the fold belt.

Copper ore was discovered in Burra creek on the 9th June 1845 by a shepherd, William Streair and shortly after another shepherd, Thomas Pickett, discovered a copper ore outcropping a few km to the north of Streair's find. Within days this caused a great flurry of activity and wheeling and dealing in Adelaide. At this time land outside the settled areas had to be purchased in 20,000-acre rectangular lots at a £1 per acre. Careful surveying showed that the two copper ore outcrops could be included in one lot. To come up with the cash two consortia labeled the "Snobs" and the "Nobs" combined to raise the necessary purchase price of £20,000. The deadline set by the governor of South Australia for the sale to go through was midday on the 18th August. They only just made it, with the last £800 in gold sovereigns being delivered to the South Australian Treasury in a wheelbarrow as 800 gold sovereigns would weigh 24.88 kg !.

Once the land had been bought it was necessary to divide it into northern and southern halves. Lots were drawn on the 20th September with the Nobs, a group of capitalists, getting the southern block and the Snobs a consortium of shopkeepers and small business men getting the northern half. Nine days later the Snobs started mining what was to become the Burra Burra or Monster mine. The Nobs mine was named the Princess Royal. The Snobs got the better deal.

To preempt a question you may ask: why the term 'Snobs' and 'Nobs'. Up to a couple of weeks ago I did not know, but one evening when I was driving back home from here I had the car radio tuned to the ABC news radio station and Kel Richards who frequently discusses the etymology of words and phrases on this station just happened to talk about nobs and snobs. Apparently years ago when you enrolled at a university the term nob or snob was placed after your name on the class lists. Nob was a contraction of the word nobility and snob a contraction of the Latin phrase sans nobility.

The Burra Burra mine is situated on a low hill just to the west of the Burra township. The country rock is composed of dolomite and minor siltstone. It is part of the Skilloalee formation of Upper Proterozoic age and encloses a small diapir. Within this diapir and between two faults which cross it lies the orebody. These two faults are named the Kingston and Tinline faults. Besides contorted and fractured masses of country rock the diapir also contains a mineralized porphyry of possible early Paleozoic age. It was thought that this porphyry

may have been the source of the mineralization but a recently determined age date on the mineralization of 797 million years shows that it pre-dates these intrusive rocks. A geological cross section through the mine and orebody shows that the orebody does not extend more than 150 m below the surface.

A list of minerals found at the Burra mine shows that the mineral assemblage consists of the usual gangue minerals and there are no unusual ore minerals. The mine, however, is notable for the size and quality of the malachite and azurite it produced rather than the variety of its minerals. About 15% of the copper is chrysocolla. (A number of specimens from the Burra mine were displayed on the front bench at the Meeting.) It is interesting to note that libethenite was not recorded from the mine until the second stage of mining proceeded in the 1970's. The malachite occurs as compact concentric banded material found filling fractures in the breccia and where there were cavities, mammillated surfaces having a high luster developed. Crystals of malachite 1-2 mm also occur. Azurite occurred throughout the mine but was most common at the bottom of the open cut. The usual habit was clusters of bladed crystals having a royal blue to blue black colour.

The Burra town council used to have its office in the Town Hall and one room there contained a display of mineral specimens from the mine worthy of permanent display in any museum. In 1970 the council moved their office to another location and the display disappeared.

There were two phases of mining operations and 2.7 million tons of copper ore have been extracted from the mine during two phases of operations. The first stage operated from 1845 to 1877 and for about 10 years it was the largest copper mine in the world. It attracted many Cornish and Welch miners and their distinctive architectural styles can still be distinguished in the mine buildings and houses in the town. For example the Cornish built round chimneys and the Welch square ones. The mine began as an open cut but it soon went underground.

When the workings reached the water table, pumps were installed. The engine to drive the pumps was installed in a large building called Morphetts engine house which was restored in 1986 and can be inspected today. The engine required a very large boiler to drive it and this was made in Adelaide and dragged to Burra on a specially made jinker drawn by a team of 40 bullocks. For many years this jinker was on display in a shelter by the main road near the swimming pool. The wood fuel needed to fire the boiler denuded the surrounding hills of their trees. The effect can still be seen today in the bare hills surrounding Burra.

The mine site remained dormant for nearly 100 years before the second phase of mining was begun. It was an open cut operation which began in 1969 and ended in 1981. To overcome the water problem SAMIN, the company mining the orebody, excavated the ore quickly and stockpiled it for processing. The method of extraction used a novel ammonia leaching process to extract the copper.

Copper oxides and carbonates react with ammonia solution forming an intensely blue copper amine complex which is soluble in water. It was an extractive metallurgical process that had not been used on an industrial scale previously and it worked perfectly for cuprite, malachite and azurite but unfortunately not for chrysocolla which made up more than 15% of the ore. To overcome this problem the ore was first roasted before leaching using gas from the Moomba-Adelaide gas pipeline which fortuitously passed within a few hundred metres from the mine.

The township of Burra now has a population of 2200 but in its heyday its population was greater than that of Brisbane and Perth combined. The town has quite a picturesque atmosphere about it and there are a number of historically interesting sites that can be visited. For instance there is the Redruth gaol which used to be a prison for 30 men and was later a prison for women. The gaol was the site of the trial in the film Breaker Morant. The rest of the film was filmed just to the east of Burra.

During the boom times many miners made dugouts to live in and they stretched for 5 km along the banks of the Burra creek and accommodated up to 1600 people. Remains of some of these dugouts still exist. They would have been quite comfortable to live in as they would be thermally insulated and as summer temperatures can stay above 40 C for several weeks and then in winter the frosts are severe. A very early example of Australian company built housing is Paxton Square which consists of a row of cottages fronting three sides of a block.

About 10km east of Burra is the Mongalata gold mine. In 1970 it was just an adit about 75 m long dug into the side of a hill and marked by an abandoned 10 head stamp battery. It has since been reworked and some beautiful gold specimens have been extracted from it.

Some notable people have come from the district around Burra, probably the most notable was Sir Hubert Wilkins, an Antarctic explorer who comes from Mt Bryan East just a few kilometers north of Burra.

David Colchester
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