Mineralogical Society of Western Australia Forward Diary 2001.

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President's Report

The April meeting, I am pleased to say, was well attended, and a number of business issues were dealt with. The Society finances are liquid with $478 in our account.

A very interesting and entertaining talk, was given by Professor Bob Gilkes, on microscopic clay minerals in the regolith.

Members are reminded not to forget about the logo competition.

A number of attractive specimens were raffled and Roger finally offloaded the last of his crystal domes.

The Simpson volumes were, however, passed in at auction but I am happy to announce that one of our country members Alan Longbottom has purchased them for the reserve price, John Reeve will be pleased!

I am informed, by our roving, Field Trip Organizer that the Cattlin Creek trip was both well attended and successful. I am yet to see my share of the booty however.

It gives me pleasure to welcome two new members Mr Noel Walkley, and Mr Joseph Cole who has already kindly offered to address the Society concerning his Prospecting exploits in the Goldfields and intends to donate a number of handmade scented soaps from his business for sale at our meetings.

Society membership now totals 23.

I will be attending the joint Mineralogical Societies Seminar in Hobart in June and will give a report on my return.

FIELD TRIP UPDATE

Finally re our Riverina fieldtrip would everyone intending to go please note the weather beforehand, as if there has been heavy rain in the Goldfields the trip maybe cancelled. Please telephone me on 93681778 for confirmation.

June 2nd – 4th
Menzies Field Trip.

June 6th
Guest Speaker
Dr Ernie Nickel.
Nickel Minerals

June 9th – 10th
NSW Gemboree

August 1st
AGM
Guest Speaker
Peter Bridge.

October 3rd
Guest Speaker
Peter Clark.
Supergene Minerals.

December 5th
Quiz Nite
Social Evening.

Newsletter Contents.

Presidents report
Inward Correspondence
Tantalum a Commodity Review.
Field Trip report.
Article by John reeve.

Inward Correspondence

The Mineralogical Society of N.S.W. May Newsletter
The newsletter outlined a mineral workshop evening in May and a fieldtrip to Marulan. Mention was made of our own Australian Prospectors and Miners Hall of Fame. An interesting article on the Societies symposium on Zeolite minerals was discussed.

The Mineralogical Society of Victoria April Newsletter
Notes from the committee was followed by notice of the Societies 25th birthday luncheon.
A fieldtrip to Arkaroola was announced. A summary of a talk entitled Zeolites: Occurrence, Synthesis and Application. Also in the newsletter are articles on gypsum from Spain, and gold in Indonesia.

The Mineralogical Society of Queensland March Newsletter
Sadly an obituary appeared concerning Sir Howard Smith one of the Societies founding members. Other news included the donation of a gold specimen by Gympie Gold to the Heritage Museum the Kilkivan fieldtrip also an article on Uranium prospecting by the late Sir Howard Smith. An article on huge gypsum in Mexico, field collecting and crystal formation also appear in the newsletter.

Field trip report for the Cattlin Creek pegmatite, Ravensthorpe, WA

Between 13 to 16 April 2001, ten members of the society (Bob and Jo Stace, Tom and Beatie Smith, Dennis and Lynn Kelsall, Jim Goldacre, Alan Longbottom, Nimal Perera and Mark Jacobson made the 530 kilometre trip from Perth to Ravensthorpe to visit and collect from the Cattlin Creek pegmatite. The trip was a success with two days of collecting only 2 kilometres north of Ravensthorpe. Most of the members stayed at the comfortable Ravensthorpe Caravan Park. Weather was good with cool evenings.

The members obtained examples of quartz, albite (variety cleavelandite), elbaite (green, pink, watermelon, cucumber, and muscovite-cored green), lepidolite, montebrasite, spodumene (green and white), manganocolumbite (to 2 cm long crystals), sphalerite, spodumene pseudomorphs (kaolinite, "cymatolite"), beryl (yellowish), schorl, apatite (grey), muscovite and microcline. RC drilling was busy blocking out tantalum ore reserves just north of the pegmatite during our visit.

TANTALUM

A

Commodity Review

by

P.W.Clark

TABLE OF CONTENTS.....

1.0 INTRODUCTION 2
2.0 BACKGROUND.....2
3.0 GEOLOGY.....2
4.0 DEPOSITS 3
5.0 COMPANIES.....4
6.0 CONCLUSION.....4
7.0 References.....5

1.0 Introduction

Tantalum is a rare metallic element used in high technology products which are heat and corrosion resistant and in electronic components. It is found in pegmatite's often associated with tin, lithium or beryllium. The major producers are Western Australia, Canada, Brazil and Southern Africa and the USSR Tantalum is also produced as a by product from the tin deposits of Malaysia and Nigeria Taylor (1999).

2.0 Background

Tantalum, chemical symbol Ta, has an atomic number of 73 and atomic weight of 180.948. It melts at 2996^{0}C and boils at 5425^{0}C. It was discovered by a Swedish chemist Anders Ekeberg in 1802. Taylor (1999). It is resistant to attach by acids and at room temperature forms a film of Tantalum oxide on the surface of the metal which acts as a protective coating. The name tantalum is derived from the mythological Greek figure Tantalus.

The metal has a wide number of applications in high technology industries. It is used in the electronics industry in the manufacture of tantalum capacitors used in audiovisual equipment, computers, communications equipment, electronic controls and instruments. It is also alloyed with cobalt, iron and nickel for use in aerospace components and in heat exchangers. Finally it has application in the

manufacture of cutting tools as tantalum carbide along with titanium and tungsten. Carlson (1993).

Approximately 50% of tantalum product is used in the electronics industry, 25% in the metal industry and 25% in the aerospace industry. Sons of Gwalia (1999).

Demand for tantalum has steadily increased since WW II particularly since the 1970s. Significant price increases occurred around 1980, 1990 and during 2000. Carlson (1993). The two largest processors of tantalum are the US Cabot Corporation and H.C. Starck of Germany. Sons of Gwalia (1999). Up until recent times the demand/supply curve has fluctuated markedly. However, the consolidation of the industry with a few producers and processors and increasing demand for electronic equipment and other applications should see market stability and growth for sometime.

3.0 Geology

Tantalum and its sister metal niobium Nb are found as oxides viz the Columbite – Tantalite group of minerals in Pegmatites. Mondadori (1988).

Granitic pegmatite's form as late stage volatile rich granitic magmas these rocks are widely distributed spatially and are concentrated in Archaean age rocks especially in Western Australia. Pegmatite's usually form dykes or sills emanating from granitoid intrusions and they are enriched in incompatible lithofile elements. The pegmatite's host Ta, Nb, Li, Be, Rb, Cs and REE, in a variety of oxide and silicate minerals. Pegmatite's have been classified into three mineralised types, simple, zoned and layered. Witt (1990). Tantalum is a rare element and average crustal abundance is about 2ppm Berkman (1995). The best analytical methods for the identification of tantalum are ICP – AES or ICP – MS (lower detection level). Analabs (1997).

3.1 Mineralogy

Columbite – Tantalite (Fe, Mn) (Nb, Ta) O_6 form a complex solid solution series between the niobium (columbite) rich and tantalum (tantalite) rich end members. The mineral is hard, dense, fragile with distinct cleavage forming opaque prismatic, stubby or tabular crystals. Mondadori (1988).

4.0 Deposits

Tantalum bearing deposits are widely distributed throughout Western Australia, Witt (1990) lists the major deposits. See table 1. They are concentrated in the Yilgarn and Pilbara cratons. Currently, Bester (1999), the industry is dominated by Sons of Gwalia. The major producers being Greenbushes and Wodgina. These form the largest deposits in the world. Other deposits owned by Sons of Gwalia include the Bald Hill deposit 120 km SE of Kalgoorlie and Cattlin Creek 150km west of Esperance.

The Pilangoora deposit 100km south of Pont Hedland is owned by Prima Resources NL while the Beryl Hill and Arthur River deposits 500km NNE of Geraldton are owned by Rare Resources NL. All deposits cover pegmatite's and the last two are overlain by elluvial resources.

The Greenbushes deposit SE of Bunbury is the world's largest hardrock tantalum resource. The NNW striking pegmatite extends for over 5km and dips moderately to the west. The pegmatite is zoned and comprises quartz, feldspars, tourmaline, muscovite, beryl and garnet with cassiterite, tantalite and spodumene. Both tantalum and lithium minerals are produced. A total resource of 68Mt at 256ppm tantalum pentoxide was quoted at June 1995 Bester (1999).

At Wodgina in the Pilbara tantalite occurs in alluvial, elluvial, and hardrock deposits. The main pegmatite

extends for some 1km in north-south direction dipping 30° to the east. A total resource of 28mt at 415ppm tantalum pentoxide was quoted at November 1998 Bester (1999).

Quantities and value of WA pegmatite minerals were, Department of Minerals and Energy (1999):

Mineral	**Tonnes**	**Value**
Spodumene	54023t	$11.453million
Tantalite	405t	$63.843million
Tin	466t	$3.768million

5.0 6.0 Companies

Sons of Gwalia is the worlds largest producer of tantalum concentrates. Increased production, increasing demand and a low $A have made the tantalum operations very attractive. Sons of Gwalia have farmed out the Bald Hill and Cattlin Creek deposits to a new company float Haddington International Resources Ltd which will develop them and sell the product to Sons of Gwalia. Gwalia plans a significant expansion of $100 million with sales contracts of 2.3million pounds of tantalum per year for 5 years Kemp West Australian (2000).

The Arthur River and Beryl Hill deposits (Rare Resources) have been joint ventured into by Borlder Gold NL and exploration is underway. At Pilangoora (Pima Resources) Lynas Gold NL acquired the rights to gold on the property. Bester (1999).

7.0 Conclusion

The current buoyant tantalum market and projected demand augers well for the industry. It is small by world mining standards and is controlled by a few players however opportunities exist for new entrants. Prime exploration acreage exists in the Yilgarn and Pilbara. The existing deposits are historical mines discovered by prospectors in the early part of last century and the use of modern exploration techniques i.e. geophysics, geology and geochemistry have been minor.

8.09.0 References

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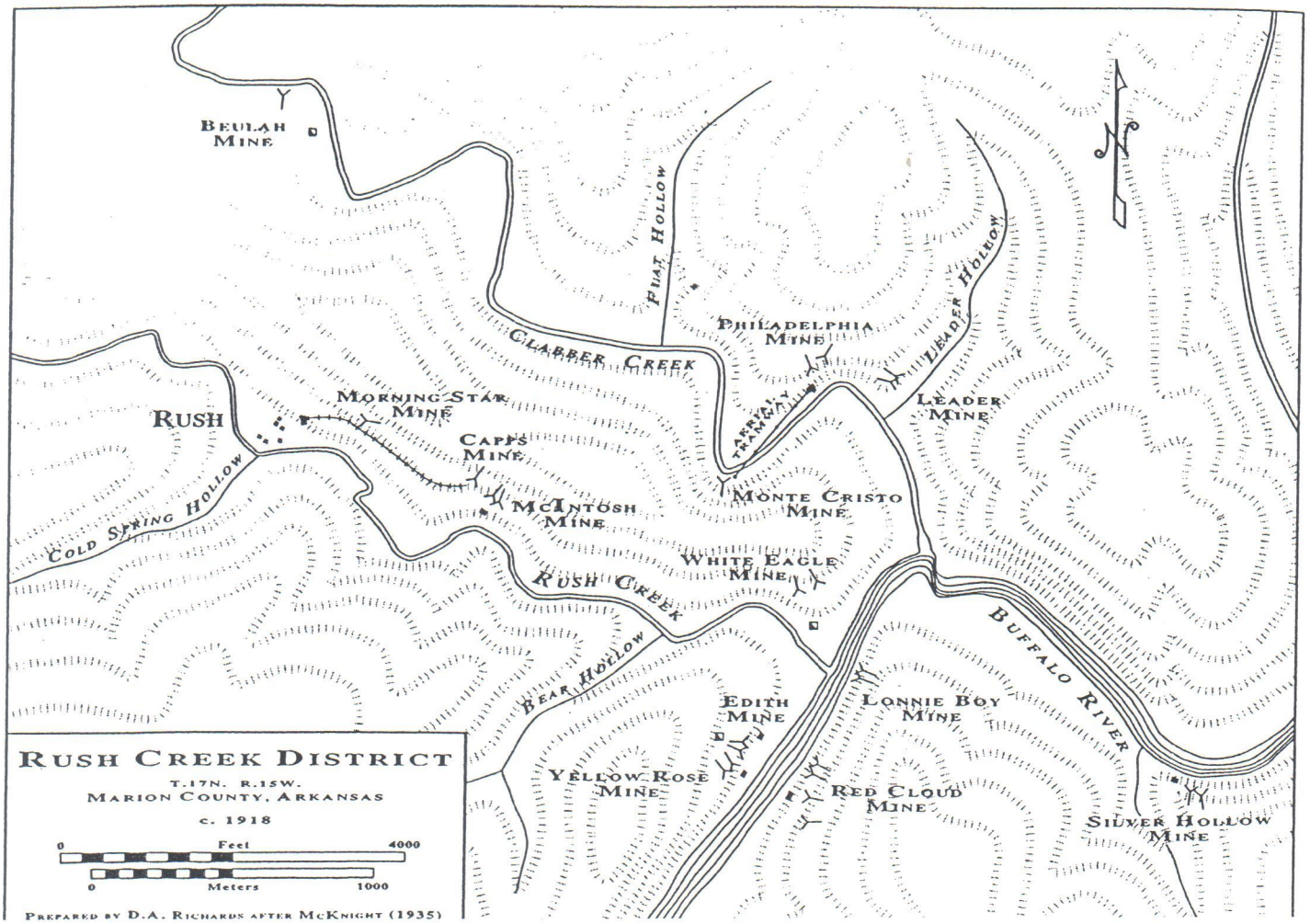
SMITHSONITE COLLECTING AT RUSH, ARKANSAS

The Rush Creek mining district is recognised as the most important lead-zinc producing area in the State of Arkansas, U.S.A.

Zinc ore was discovered in the district in the 1880's. Mining was periodic from the date of discovery to 1962, the most productive times being during the two World War periods.



Geology

The rocks of the Rush District are all sedimentary and range in age from Ordovician to Mississippian. Three normal faults cross the district. The ore deposits are related to the mapped faults, but lie in runs as irregular ore bodies in the vicinity of the faults. Monoclinal folding of the sequence resulted in zones of tension fractures and subsequent development of solution cavities and collapse breccias. Dolomitization and silicification of these zones increased the availability of open channels to ore mineralisation. Work done in 1970 indicates that hydrothermal fluids rose along faults until zones of high porosity and permeability were encountered and deposition took place.

Paragenetic Sequence

Primary mineralisation began with dolomite (as pink curved rhombohedra and saddles) followed by sphalerite, marcasite, pyrite and chalcopyrite. A secondary phase resulted in the deposition of hemimorphite, smithsonite and minor occurrences of aurichalcite, malachite, greenockite, gypsum, aragonite and botryoidal calcite.

Smithsonite $ZnCO_3$

From a collectors point of view, the smithsonite specimens to be found at Rush are the equal of any smithsonite found in the United States.
The habits, textures and colours of smithsonite vary from mine to mine and from pocket to pocket in a mine, such that the locality of some specimens can be inferred based on their distinctive appearance.
Although pure zinc carbonate is white, smithsonite commonly exhibits allochromatic colouration due to the presence of transition metals and their compounds. Shades of grey and brown are the most abundant, although white, black and yellow are common. Occasional pockets tend toward orange, red or reddish purple. The most sought after specimens have been coloured bright canary to lemon yellow by the presence of greenockite (CdS) In the vernacular of the day, yellow smithsonite was known as "turkey fat" and a pocket of yellow smithsonite was said to have been "turkeyfied".

Small individual crystals of smithsonite exhibit the scalenohedral and rhombohedral forms and often with curved faces. These specimens are particularly attractive micromounts.

Collecting Today

In 1984 when I collected at Rush, the mines were quite accessible but as usually happens in the United States, the fear of litigation forced the mines to be closed by the Parks and Forests Department.

The previous availability of material from the mines has ensured that Rush smithsonite is widely spread in macro and micro collections and occasionally available by exchange, particularly with Arkansas collectors.

John Reeve

Further Reading

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Joining Fee	$5.00
Adult Member	$20.00
Newsletter only	$15.00

An application form for membership can be obtained by writing to: -
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Ordinary meetings of the Society are held on the Ist Wednesday in February, April, June, August, October and December in the Rotary Hall, Sandgate Street, South Perth commencing at 7.30pm. The January meeting will involve social activities at a time and place to be notified.

Visitors are most welcome

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