Mineralogical Society of Western Australia (inc.)

October 2002

Volume 2, Issue 5

Forward Diary
2002 - 2003

***February* 5th**
Club Meeting

***April* 2rd**
Club Meeting

***June* 4th**
Club Meeting

***August* 6th**
Club Meeting

October 2th
Club Meeting

December 4th
Club Meeting

Newsletter Contents.

Presidents Report

It gives me pleasure to announce the re-election of the previous committee and thank the members for their year of support. My introductory lecture to mineral chemistry given at the AGM began our series on mineralogical topics and will be followed up by lecture notes the next in the series is **the physical properties of minerals by Ted Fowler.** The recent trip to Mukinbudin was I`m glad to say very well attended and the beautiful Spring weather saw the unearthing of a number of Rare-earth elements including xenotime zircon Y-fergusonite and the rare-earth epidote allanite, our thanks goes to the leaseholder.

I have just returned from the Goldfields on a fact-finding mission re our 2005 seminar. I would like to thank those who have answered the call and offered their assistance especially Roger, Mignon and Suzanne.

I look forward to the coming year with eager anticipation. Lastly on behalf of the members I would like to send get well wishes to John Rawlings who is again unwell.

Field trip to the Karloning Pegmatite
Mukinbudin, WA

The Mineralogical Society of Western Australia field trip on the 7th of September 2002 was a success with 16 members arriving to collect at the pegmatite. The active owner, Graeme Hepple was on site, working the deposit with an employee. Graeme provided us with a brief history of his mining activities. In October 1998, he had obtained lease P 70/1322 on the freehold farm property owned by John O'Neil. Graeme is crushing the pegmatite mullock into a gravel for making an attractive white quartz-feldspar floor tile and as garden and yard material. Selective crushing of pure white albite is also done for selling as reagent grade sodium feldspar. No new excavation of the pegmatite has been done nor is it planned.

Without difficulty we found milky quartz, microcline, albite, biotite, several unidentified clay minerals, secondary opaline coatings and magnetite. Sue Koepke found a single sample of what may prove to be a fibrous green epidote. Rose quartz was also found. The collecting of rare minerals was also successful with everyone obtaining samples of black metamict masses of allanite, brown metamict, elongated crystals of fergusonite-(Y), red-brown single crystals of xenotime and radiating nodules (1-3 cm diameter) of gray metamict zircon (variety cyrtolite). All of these were hosted in albite. No rare-earth minerals were found in or near the giant biotite crystals that were sparsely present in the albite masses. Although these minerals are unattractive, they are rare in Australia. This pegmatite as well as the other pegmatites in the Mukinbudin pegmatite field are great examples of NYF (Niobium-Yttrium-Fluorine) pegmatites. Other NYF pegmatites are found in the Olary province of South Australia.

Since these minerals are almost never found in Western Australia, a brief description of their characteristics is provided to aid in their identification.

Allanite forms 1 to 10 centimetre masses without crystal faces in albite. Allanite is pitch black, opaque in color with a glassy, slightly bumpy fracture. Surfaces of these masses may be altered to a red-brown color with black only seen in the interior. These masses are metamict and mildly radioactive with a density of 3.62 gm/cc.

Fergusonite-(Y) from this pegmatite is probably the second confirmed occurrence in Western Australia. Fergusonite-(Y) forms elongated crystals with a square cross section in albite. Individual crystal sizes varying from 2 millimetres to 1 centimetre in diameter and 1 to 5 centimetre lengths. Crystal faces are brown with an earthy luster. Fractures surfaces are highly lustrous, smooth and glassy with a brown to greenish-brown color. Typically the albite surrounding the fergusonite is stained brown. The fergusonite is always metamict and strongly radioactive. Its density varied from 4.6 to 5.14 gm/cc. The calculated ideal, crystalline density of fergusonite is 5.38 gm/cc; metamictization decreases the density.) Occasionally the fergusonite forms masses of radiating single crystals in albite.

Xenotime from this pegmatite is the first occurrence in the Mukinbudin pegmatite field. The xenotime forms reddish-brown masses intergrown with fergusonite-(Y) and single crystals to 0.05 centimetres in albite. The crystal faces are an earthy red-brown with slightly rounded crystal edges. Fracture surfaces are an irregular red-brown. The density of xenotime varies from 4.4 to 5.1 gm/cc. The xenotime does not seem to be metamict. Halos of brown stained albite are not present around xenotime crystals.

Zircon variety cyrtolite is probably the second documented occurrence in Western Australia. The zircon forms absolutely typical crystals of nodules with radiating, multiple crystals growing outward from a central point. These nodules average between 2 to 4 centimetres in diameter. Individual pointed crystal ends project from the masses like thorns. Fractured masses have a slightly bumpy glassy luster with a light to dark grey color. Crystal faces have a grey, earthy luster. The zircon is metamict, and moderately radioactive with a density of 3.4 to 4.0 gm/cc. The density of ideal, crystalline zircon is 4.7 gm/cc. The albite surrounding the zircon is stained a light brown.

Although general information about the chemical and physical properties of xenotime, fergusonite, zircon and allanite can be found on the internet using the google.com search engine, the best published reference on fergusonite can be found in Cerny and Ercit (1989). The best description of zircon variety cyrtolite is in Jacobson (1999). A good explanation on metamictization is in Mitchell (1973a and b).

References Cited.

Cerny, P. and T. S. Ercit. 1989. Mineralogy of Niobium and Tantalum: Crystal chemical relationships, paragenetic aspects and their economic implications. In: Lanthanides, Tantalum and Niobium, P. Moller, P. Cerny and F. Saupe, editors. Springer-Verlag, Berlin. p. 27-79.

Jacobson, M. I. 1999. Zircon, variety cyrtolite: a review (abstract). The Canadian Mineralogist, V 37, p. 855-856.

Mitchell, R. S. 1973a. Metamict minerals: a review, Part 1. Mineralogical Record 4:177-182.

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GENERAL INDEX TO THE DIGEST OF MINERALS OF THE KALGOORLIE REGION

Can you help? As members are aware, the Society is preparing a Digest of Minerals of the Kalgoorlie Region for the 2005 joint Mineralogical Societies meeting and we need your help with this project. Can you add a mineral(s) to our list by providing information on the locality in our target area or tell us about a locality for any of the minerals listed below.

The target area is basically a rectangle bounded by Menzies in the north, Widgiemooltha in the south, a line 20 km east of Kalgoorlie and Bullabulling to the west If you can help, please pass on your information to either Mark Jacobson or John Reeve. Your assistance will be genuinely appreciated

Actinolite
Aguilarite
Albite
Allanite-(Ce)
Altaite
Alunite
Amalgam
Annabergite
Amblygonite
Analcime
Andalusite
Anglesite
Anhydrite
Anorthite
Antigorite
Arsenic
Arsenopyrite
Atacamite
Augite
Axinite
Azurite

Barite
Bavenite
Beryl
Biotite
Bismite
Bismuth
Bismutite
Bityite
Bornite
Bournonite

Calaverite
Calcite
Carnotite
Carrollite
Carrboydite
Cassiterite
Cerussite
Chalcocite
Chalcopyrite
Chlorargyrite
Chlorite
Chloritoid
Chromite
Chrysolite
Clinobisvanite
Clinozoisite
Coloradoite
Cookeite
Copper
Coquimbite
Corundum
Covellite
Crocoite
Cryptomelane
Cubanite
Cuprite

Diopside
Dolomite
Dravite

Elbaite
Emmonsite
Enargite
Enstatite
Epidote
Epsomite
Ernienickelite
Erythrite

Ferberite
Ferrocolumbite
Fluorite
Forsterite

Galena
Gaspeite
Gibbsite
Glaukosphaerite
Goethite
Gold
Graphite
Gypsum

Halloysite
Hausmannite
Hematite
Hessite
Hornblende
Hydrohonessite

Ilmenite
Ixiolite

Jamesonite
Jarosite

Kambaldaite
Kaolinite
Kyanite

Laumonite
Lepidolite
Leucoxene
Limonite
Linnaeite

Mackinawite
Magnesite
Magnetite
Magnolite(?)
Malachite
Manganite
Marcasite

Margarite
Melanterite
Melonite
Mesitite
Microcline
Miloschite
Molybdenite
Montmorillonite
Moraesite
Morenosite
Muscovite

Nagyagite
Natrojarosite
Natronitrite
Naumannite
Nepouite
Niccolite
Nickelblodite
Nickelhexahydrite
Nimite
Nontronite
Nullaginite

Olivenite
Onofrite
Opal
Orpiment
Orthoclase
Otwayite

Paragonite
Paratacamite
Pecoraite
Petalite
Petzite
Polydymite
Prehnite
Proustite
Psilomelane
Pyrargyrite
Pyrite
Pyrrhotite

Quartz

Realgar
Reevesite
Retgersite
Rickardite
Rutile

Scheelite
Schorl
Seligmanite
Siderite
Smithsonite
Spessartine
Spinel
Spodumene
Staurolite
Stilbite
Sylvanite

Takovite
Talc
Tennantite
Tetradymite
Tetrahedrite
Titanite
Tomichite
Topaz
Tremolite
Tucekite

Vanadinite
Variscite
Vermiculite
Violarite

Widgiemoolthalite
Wulfenite

Zinnwaldite

Bio Mining excerpt from AMM FEB 2002

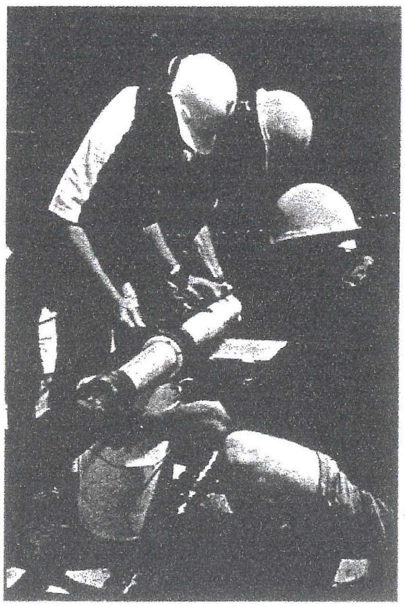
Extreme search

IT IS being described as the next mineral industry revolution: biomining.

CSIRO scientists believe the advent of bioprocessing — recovering metals with the aid of microbiological creatures, or bugs — will be to the metals sector what carbon-in-pulp processing technology was to Australia's gold industry 20 years ago, turning it from a minor player into the world's third largest producer.

"We are starting to see bioprocessing and bioextraction as serious alternatives to chemical or engineering methods of mineral extraction, particularly for metals," said the chief of CSIRO Minerals, Dr Rod Hill. "Hence the race to be first to discover the magic bug."

Biotechnology is already transforming healthcare and agriculture. Dr Hill said mineral extraction was next. The technology was used in some mineral processing operations, to concentrate gold or copper, or to purify waste-streams, but nothing compared with what was on the horizon, he said.



The search for "extremophile" — bugs which can tolerate extreme conditions — is taking CSIRO researchers to similarly unpleasant locations.

Bugs might actually be sent underground to extract minerals or energy, win metals more cheaply, cleanly and greenly than any existing process, and in the process enable mining companies to access vast untapped mineral reserves.

"Fourteen percent of Australia's total electric power is currently consumed in crushing and grinding ore," Dr Hill said. "Imagine the savings in both energy and greenhouse emissions if we can eliminate the grinding step and bioprocess part of the ore instead.

"Nowadays, with an average gold ore, we need to crush 2.5 cubic metres of rock to get enough gold to make a wedding ring. But microbes can perform the same task using much less energy."

CSIRO's search for "extremophiles", or bugs which tolerate extreme conditions — a search that takes scientists to the edges of active volcanoes, or to the ocean depths to explore hydrothermal vents — is driven by the observation that they outperform microbes that operate at lower temperatures. Dr Peter Franzmann, of CSIRO Land and Water, said high temperatures literally thrust the bugs' metabolism into overdrive. This seemed to offer the brightest prospects for efficient new mineral extraction processes in situations where conventional techniques were uneconomic and/or would have a negative impact on the environment.

Major international mining companies are already embracing bioprocessing to extract mineral residue from waste-heaps which, if processed by conventional methods, would be uneconomic. To Dr Hill, this opens up one of the most exciting prospects of all: a mineral industry no longer reliant on the discovery of giant high-grade ore deposits. Bioprocessing would make low-grade resources an economic prospect.

Combining expertise from four of its divisions, CSIRO has put together a multi-disciplinary team of researchers to find the magic bug, or bugs.

"Only with a team of this scope will we be able to address this exciting opportunity with the necessary cross-boundary flexibility," Dr Hill said.

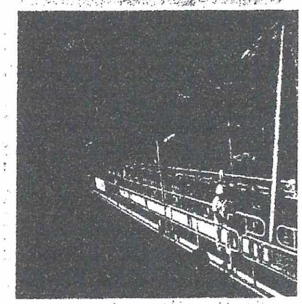
COMMODITY FOCUS

No.1 in iron ore

AUSTRALIA has the world's lowest-cost iron ore mines, according to the latest AME Mineral Economics industry review. Exchange rate benefits and massive productivity gains had hacked 27% off production costs at Australian mines since 1997, the research house said.

Its report stated that Brazil, the world's largest iron ore producing country, had also reduced its cost base significantly between 1997 and 2001. Average costs had fallen by 32%, however, AME said Australian mine productivity gains had occurred at a higher rate than in Brazil.

Iron ore operations owned by the top 10 producers accounted for about 60% of western world iron ore output, with the "big three" producers — Brazil's CVRD and Australia's Rio Tinto and BHP Billiton — slashing their average FOB costs by 30% to $US5.73 per tonne between 1997 and 2001.



"Rio Tinto and CVRD share the honours of lowest-cost producer in 2001," AME said. "While Rio Tinto is the lowest-cost company on a cost per tonne basis, CVRD's higher quality ore grades and investments in ore beneficiation gives it the edge on a cost per iron unit basis."

AME said consolidation within the world iron ore industry would produce further decreases in real production costs over the next five years, though these would come at a slower rate than since 1997.

It said while steel production in the traditional major markets of Japan and Europe had waned, overall demand for iron ore remained strong. Growing consumption by a booming Chinese steel industry as well as strong pig iron output in South Korea and Taiwan had buoyed production levels for the industry's major producers.

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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 **W.A.Lapidary and Rock Hunting Club rooms 31 Gladstone Street Rivervale**, commencing at 7.30pm. The January meeting will involve social activities at a time and place to be notified.

Visitors are most welcome

Newsletter of the Mineralogical Society of Western Australia
13 Buchan Place, Hillarys, 6025
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OUR SOCIETY's MISSION

To encourage mineralogical study by amateur and professional alike and, in so doing, discover, document and preserve the earth's and in particular Western Australia's natural history.

OBJECTIVES

Whilst focusing on the minerals of Western Australia, the overall objectives of the Society shall be:

(a) To advance the science of mineralogy.
(b) To disseminate knowledge of minerals, their occurrence and associations.
(c) To establish and maintain a register of mineral species and their occurrences in Western Australia.
(d) To increase knowledge of related fields of earth science.
(e) To keep members abreast of developments in mineralogy.
(f) To encourage an appreciation of the aesthetic value of minerals.
(g) To promote the proper care and preservation of mineral specimens.
(h) To promote the conservation of the geologically unique and of the environment in general.
(i) To provide a means of contact between professionals and amateurs in the various fields of the earth sciences.
(j) To foster a sense of cooperation and understanding between individuals, institutions and resource companies in the field of mineralogy.
(k) To provide a forum for debate and discussion on matters relating to mineralogy.