

**Joint Mineralogical Societies of Australasia  
35th Annual Seminar**



**Perth, Western Australia  
9th and 10th June 2012**

*Angela Riganti*

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#### Cover photograph acknowledgements:

- Red centered radial spectrum of xenotime supplied by John Harris of Gemlab, England
- this logo also appears on the pages throughout this document in the footer

#### Mineral images: Also supplied by John Harris

- Top row LHS xenotime crystal from Pakistan - 8.7 x 2.25mm. Wt. 1.73ct.
- Top row RHS monazite crystals from Buenopolis Mine, Minas Gerais - 8 x 7.5mm. Wt. 2.03cts
- Bottom row LHS faceted remondite from Mt. St. Hilaire, Quebec - 5.3 x 3.75mm. Wt. 0.47ct. This sample shows a dramatic colour change to lime green in a standard mercury fluorescent lamp
- Bottom row RHS faceted bastnäsite 7.4 x 5.1mm. Wt. 1.85ct.
- John Haupt for :centre image - Paratooite crystal spray, supplied by Steve Dobos

# Welcome to Perth

On behalf of the Mineralogical Society of Western Australia I would like to extend a warm welcome to all attendees of this 35th Annual Seminar of the Joint Mineralogical Societies of Australasia.

A special thank you goes to our speakers, our visitors from overseas and interstate, and to the Hon. Michael (Mike) Nahan MLA. Dr Nahan, who is officially opening our Seminar, is acting as Representative for the Hon Norman Moore MLC Minister for Mines and Petroleum, Fisheries and Electoral Affairs.

Although today Western Australia is the undisputed mining powerhouse of the nation, this is only the second time that this event has been held in this State. My committee was therefore determined to make this seminar the kind of success that will be fondly remembered for years to come.

We decided on "Rare Earth Minerals" as the subject for the seminar. It is a topical subject and has important issues – while once clouded in obscurity; rare earths minerals are now creating considerable interest in the media. We felt the subject was big enough and worthy of being the sole focus of a seminar.

We have put together a varied program for you. We have an excellent line up of eminent speakers, exploring the subject of rare earth minerals from many perspectives. I am sure they will keep you thoroughly engaged over the two days of this Seminar. There will be opportunities to meet and talk with our speakers during the day and at the Seminar Dinner, as well as at the winding-up party on Sunday night. This event has been generously provided and hosted by our patron Mr Mark Creasy.

Following the Seminar, on Monday morning, we have the mineral market, and this is to be followed on Tuesday by the ten day field trip that starts out towards Kalgoorlie.

On behalf of Mineralogical Society of WA I would like to take this opportunity to thank all those who have made this event possible; our patron Mr. Mark Creasy, Crystal Universe, and Archean Resources for their generous donations. Our thanks to the State Library of Western Australia for providing this venue on reasonable terms and to the Gemmological Association of Western Australia for making their facilities available for the Micromount symposium held yesterday. Thanks also to all those who have donated items to be auctioned at the Dinner this evening. In addition we acknowledge Lotterywest for making funds available for some of our equipment purchases over the past year.

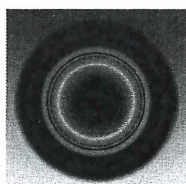
Again, thank you to our speakers – if it were not for them, we would not be gathered here today.

Finally, but importantly, I would like to thank my hard working committee and the volunteers for all the hours, evenings and weekends they have put into organizing this Seminar.

To everyone who has supported this event, in everyway, thank you.

**Stewart Cole**

President of the Mineralogical Society of Western Australia





## Sponsorship Acknowledgements

The Mineralogical Society of Western Australia wishes to thank: our sponsors for their generous and ongoing support and donations;



- Our patron Mr Mark Creasy



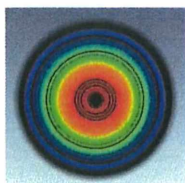
- Crystal Universe



- Archean Resources



- Lotterywest
- Gemmological Association of Western Australia
- The Geological Survey of Western Australia
- Howard Dawson of LatinGold



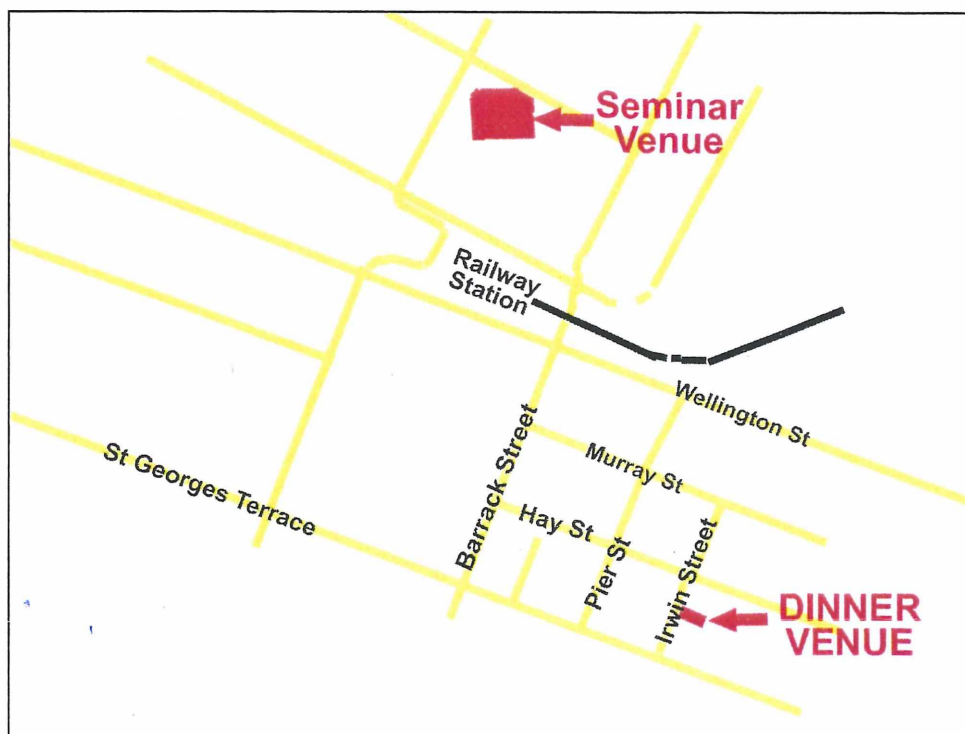
# General Information

## The Seminar Venue and Parking

The State Library of Western Australia is located in the Alexander Library Building Perth Cultural Centre at 25 Francis Street, Northbridge, (6003).

24 hour undercover parking is available directly beneath the building in the number 11 Perth City Council Car Park. Entrance to the car park is from Francis Street. Information on alternative parking in the area is available on the city of Perth web site;

<http://www.cityofperth.wa.gov.au/web/Visiting/City-of-Perth-Parking/>.

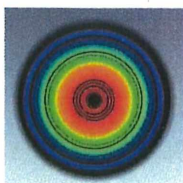


## Public Transport

The library is a short walk north of the Perth railway station and the Wellington Street Bus Station. The Blue [Central Area Transit \(CAT\) buses](#) travel close to the building with stops in Beaufort, Aberdeen and William Streets.

## Access for People with Disabilities

There is wheelchair access to the Alexander Library Building from James or Francis Streets, lifts to all floors and a wheelchair accessible toilet on each floor.





## Registration for the Seminar

Registrants can collect their identity badges and documentation for the Seminar on 9 June from 08.30 – 09.30 in the State Library Theatre Foyer.

## Seminar Catering

As per the Timetable for the Seminar, morning tea, afternoon tea and a light lunch will be provided in the State Library Theatre Foyer and environs. Morning Tea on Saturday morning will be served between 08.30 and 09.30.

## Seminar Dinner and Auction

Saturday evening 9 June - Arrivals from 18.30 for a 19.00 start at the Mercure Hotel. (See map previous page).

A Mineral Auction will be held during dinner.

## State Delegates and Australian Journal of Mineralogy meetings

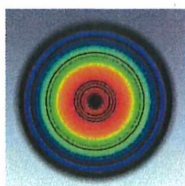
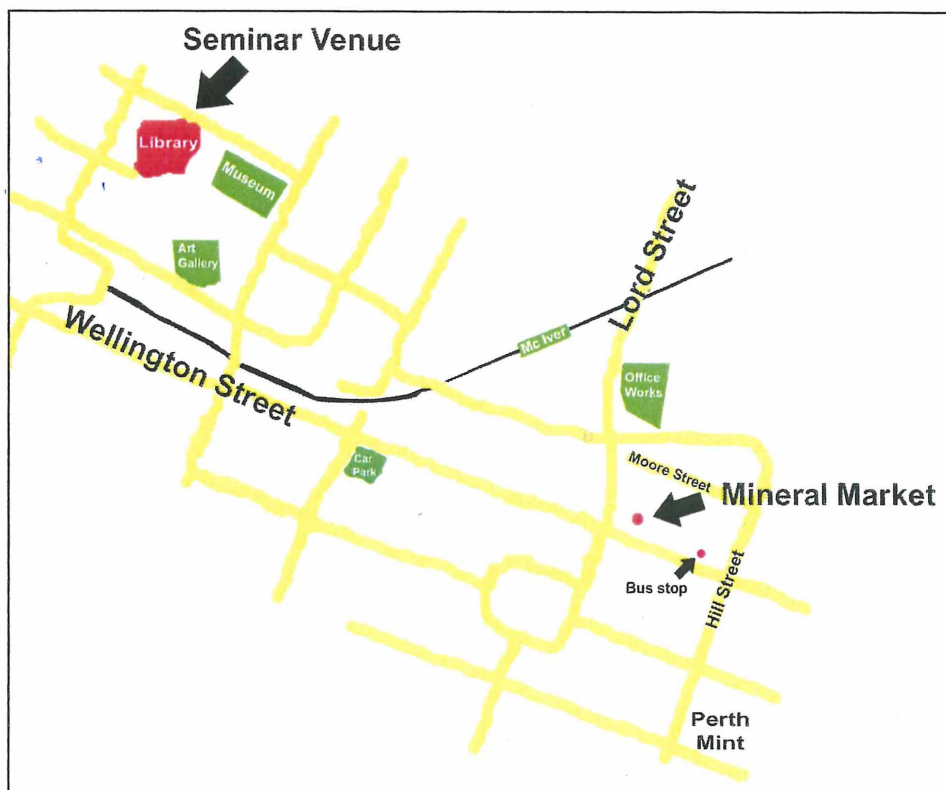
Sunday 10 June - 08.15 until 09.45 AGM.

Venue - Pilbara Room, State Library off the foyer.

## Mineral Bazaar

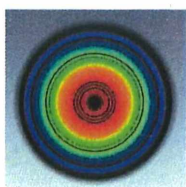
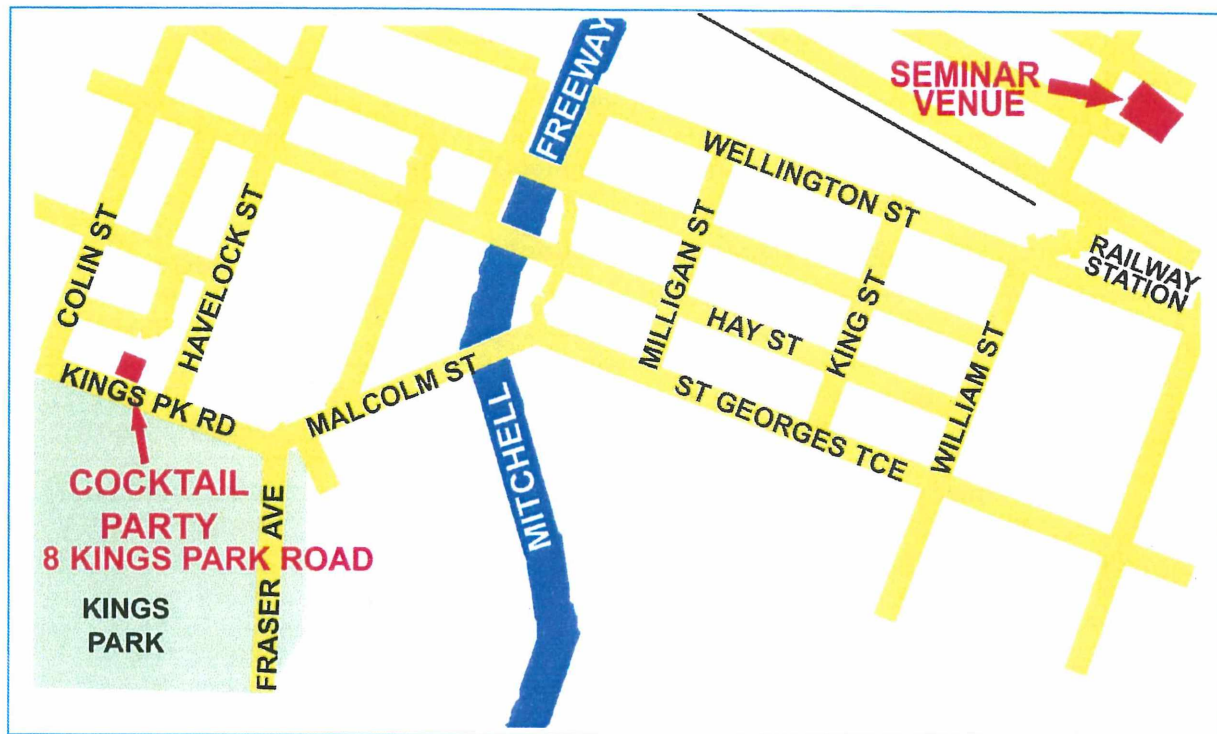
Monday 11 June - from 08.00 for sellers to set up. Doors open to buyers from 09.00 until 12.00.

The mineral market venue is Philately House, Unit 18 Wellington Fair, 200 Wellington Street or 40 Lord Street - corner of Lord and Wellington Streets



## Social Event at the home of Mark Creasy

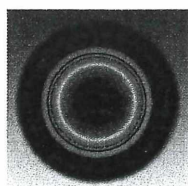
Sunday 10 June - From 18.00 at 8 Kings Park Road, Perth



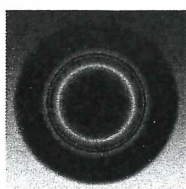


# Seminar Program

<b>Saturday 9th June 2012</b>	
08.30 – 09.30	Registration and Morning Tea
08.30 – 09.30	Mineral Artist Session - Steve Sorrell
09.30 – 09.35	Stewart Cole – Welcome
09.35 – 09.50	Official Opening – Rt Hon. Dr Michael Nathan MLA
09.50 – 10.50 Steve Dobos	An Introduction to Rare Earth Minerals
10:50 – 11:00	Short break
11.00 – 11.30 Angela Riganti	Rare Earth Deposits of Western Australia: From Exploration to Exploitation
11.30 – 11.50 Peter Downes	Rare earth minerals of the Cummins Range Carbonatite Complex, Kimberley Region, Western Australia
11:50 – 12.05	Short break
12.05 – 12.50 Theo Klopogge	REE Minerals in Scandinavia – A few snapshots from Sweden and Norway – (Presented by Steve Dobos)
12.50 – 13.50	Lunch Break – Light Lunch in the Library Lobby
13:00 – 13:45	Mineral Artist Session - Steve Sorrell
13.50 – 14.30 Dudley Kingsnorth	The Rare Earths Industry: A Delicate Balancing Act
14.30 – 15.15 David Vince	Rare Earths in China: Abundance, Conflict, Diversity and Collectors' Opportunity
15.15 – 15.40	Afternoon Tea
15.40 – 16.25 Margot Willing	The significant role of REE's in man-made gemstones, natural gemstones, micro-minerals and rare collectable minerals
16.30 – 17.00	<u>Field Trip Participants -</u> Field trip group briefing with Ted East
18.30 for 19.00	Dinner at the Mercure Hotel – (See venue map)



<b>Sunday 10th June 2012</b>	
08.15 – 09.45	<b>AGM of AJM and Annual Meeting of the Joint Mineralogical Societies of Australasia - Pilbara Room in the Library foyer</b>
09.45 – 10.15	Morning Tea
10.15 – 10.45 Peter Elliot	<b>The Paratoo Mine</b>
10.45 – 11.20 Brendan Shand	<b>The Mt Weld Rare Earths Project</b>
11.20 – 11.40	Short Break
11.40 – 12.10 Marcus Sweetapple	<b>Petrogenetic Classification of rare earth enriched pegmatites, with reference to their REE mineralogy and Australian occurrences</b>
12.10 – 12.35 Rod Martin	<b>Rare Earth Elements in New Zealand</b>
12.35 – 14.05	Light Lunch in the Library Lobby
13.10 – 14.00 Margot Willing	<b>Viewing of faceted rare earth minerals and rare earth doped gems</b>
13.10 – 14.00	<b>Mineral Artist Session - Steve Sorrell</b>
14.05 – 14.35 Ralph Bottrill	<b>Rare Earth Rich Minerals and Rocks in Tasmania</b>
14.35 – 15.15 Trudi Kennedy	<b>REEs in Meteorites from Chondrites to KREEPy Rocks</b>
15.15 – 15.45	Afternoon Tea
15.45 – 16.20 Dermot Henry	<b>Mining Museum Collections for rare earth elements</b>
16:20 – 16:45	<b>Panel discussion</b>
From 18.00	<b>Social event at the home of Mark Creasy 8, King's Park Road, West Perth.</b>





# Abstracts of the 35th Joint Mineralogical Societies of Australasia Seminar

## Ralph Bottrill

Ralph Bottrill is a mineralogist/petrologist with Mineral Resources Tasmania, and an honorary research associate with the Tasmanian Museum and Art Gallery and the Queen Victoria Museum and Art Gallery. He has a BSc (Hons) and MSc in geology and mineralogy from the University of Adelaide and University of NSW respectively. Since graduation he has worked in the exploration and mining industries and geological surveys sometimes as a geologist or database manager, but mostly on varied mineralogical, petrological, geochemical, pedological and metallogenic studies, including many forensic investigations. He has worked mostly on Tasmanian topics since 1985, and has recently rewritten the Catalogue of Minerals of Tasmania.

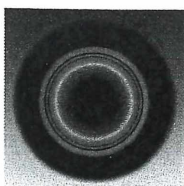
## Rare Earth Rich Minerals and Rocks in Tasmania

The main rare earth element (REE) bearing minerals in Tasmania are in the monazite, allanite, florenceite and xenotime groups, all relatively common, plus a rare rhabdophane group mineral, and small amounts in perovskite and brannerite. Rare earths are enriched in many Tasmanian rocks, but they usually lack the geological factors such as highly alkaline magmas required for substantial accumulations of these metals.

Monazite (mostly Ce-dominant), with lesser xenotime and allanite, is common in most granites and many metamorphic rocks in Tasmania and detrital monazite is particularly abundant in cassiterite-rich placers derived from areas of Devonian granite in north-eastern Tasmania. There is particular enrichment in the Devonian granite-related tungsten deposits (veins, greisens and skarns), mostly as monazite, xenotime and allanite, but because of general low alkalinity these are unlikely to produce economic deposits, except in some associated placers. Brisies, Pioneer and the South Esk alluvial tin mines all are particularly rich in monazite. Attempts around 1900 to recover monazite from these placers ceased because the 32t of monazite concentrates yielded only 2% ThO<sub>2</sub>, the only valuable extractable commodity at the time (used for making incandescent mantles). There is also significant monazite in many Tasmanian beach sands.

The Cretaceous alkaline igneous rocks in Tasmania (e.g. Cygnet and Eddystone) are commonly REE enriched, probably as monazite, but are mostly small bodies, and none are enriched to ore grades. Similarly some phonolites in the Temma area, REE-rich mafic dykes in the Glovers Bluff area and many Cambrian Mt Read Volcanics are also rather enriched in REE (up to 0.1% total REE) but not to economic grades.

Some chlorite-rich selvages between siderite-galena veins and siltstone country rock in the Silver reward mine, Interview River, on the west coast of Tasmania, contains abundant monazite (both Ce and Nd dominant), xenotime and apatite, plus traces of uranium and thorium minerals. The deposit appears small but has not been fully evaluated. The Savage River magnetite mines contain up to 0.2% (Ce + La) in pyritic ores, as monazite, but such grades appear uncommon.



Allanite (probably Ce-dominant) is not uncommon in some copper veins in the Precambrian rocks of western Tasmania. Florenceite-(Ce) has been found as fine grained aggregates in pyrite-chalcopyrite-siderite-quartz ores, Prince Lyell Mine, Queenstown. It also occurs as fine-grained aggregates in sub-basaltic kaolinitic clays, e.g. Ledgerwood, and as small alluvial grains in the Savage River area.

Brannerite occurs in gold-bearing quartz veins in Precambrian schists at the Specimen Reef Mine, near Savage River. Perovskite occurs as an abundant accessory in the melilite-rich basaltic rocks on the Shannon Tier as microscopic yellowish-red grains and crystals. Rhabdophane was found as a very fine grained component in halloysite veins in Jurassic dolerite near Taroona.



Picture: Monazite on quartz, Lemonthyme Hill, M. Latham. FOV ~ 10mm

#### REFERENCES

Bottrill, R. S. and Baker, W.E., 2008. *A Catalogue of the Minerals of Tasmania*. Bull. 73. Tasmanian Geological Survey.

