



THE MINERALOGICAL SOCIETY OF NEW SOUTH WALES INC

Website: www.minsocnsw.org.au

Please address all correspondence to :-
The Secretary, 58 Amazon Road, Seven Hills, NSW 2147

NEWSLETTER APRIL 2024

The April Meeting will be held in the clubrooms of the Parramatta and Holroyd Lapidary Club at 73 Fullagar Road, Wentworthville, at 7.30 pm on the 5th of April 2024

Mark Walters will give a talk on ‘**A Visit to Other Mines in the Bamford Area, Nth Qld**’.

The talk will be followed by a lecture to be given by Arnold van der Heyden on :-

‘Broken Hill: Minerals Hiding in Plain Sight’.

FORTHCOMING MEETINGS and PROGRAMS

May 3rd : **Member’s Annual Mineral Auction.**

The Society Annual Mineral Auction will be held at the May Meeting conducted by our Auctioneer, Glenn Brown. Members are invited to start selecting specimens for sale of up to about one dozen per member. A list of these will be compiled and distributed to members in due course. In addition to single specimens trays of minerals may be sold by silent auction.

June 7th : and July 5th: Programs to be confirmed.

August 2nd : Society A.G.M. and Memorial Lecture.

The SOCIETY COMMITTEE

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	Mark Walters	Mobile: 0421 012 647
	Ed Zbik	Mobile: 0401 538 480

Mineralogical Records for Sale

About two-thirds of the collection of **Mineralogical Records** donated by Noel Kennon and listed in the March Newsletter has been taken by members or for the Society Library. The remainder, in batches, will be brought to the General Meetings for members to examine and purchase more if required. A list of the **Rocks & Minerals** magazines is to follow.

The MARCH MEETING

At the commencement of the March Meeting there were a few announcements. Ed Zbik brought member's attention to the information provided in the latest Society Newsletter about the **Mineralogical Records** for sale and the information on references to Australia in the Library collection of Records. A list of the donated **Rocks & Minerals** magazines for sale would be distributed in due course.

John Chapman reported that during a trip he had made the previous week to the NSW Northern Rivers region he had met up with long-time Society member John Hoffman in Lismore. John had extended an invitation to any members to visit him if they were passing through the town. His contact number could be provided if required.

The President, Dieter Mylius, reminded members that Society subscriptions were due and was advised by the Secretary that only a little more than half of members financial for 2023 had renewed for this year.

(NOTE: Society financial membership had just reached 100 by the end of last year, membership over the previous two years having 'taken a hit' due to the COVID episode. Upon checking the 2024 figures later it was found that current renewals were already about three quarters of those for 2023).

Dieter Mylius reported that a few members had joined the **field trip to Mt Tennyson** organized by Mark Walters last month. It had been a good trip with good weather and a number of mineral specimens had been found and brought back. Mark was continuing to make contacts and arrangements for a trip to **Manuka**, most likely to be scheduled for late April but could not confirm a definite date yet.

Graham Ogle was asked about a date for the next **Micro-mount meeting** and suggested that it would most likely be held on Sunday the 24th of March but this was still to be confirmed.

The President also reminded members about the forthcoming **National Gem & Crystal Expo** being held over the weekend of the 20th and 21st of April and that the Society had been invited to set up an information and promotional table and display. Volunteers were needed to 'man' the table and describe Society activities to visitors. Members able to help for perhaps just a single morning or afternoon of the two days should notify the Secretary, George Laking.

With no more announcements being made the President introduced the first speaker for the evening.

'Minerals and Metals – How and Why' **Geoff Parsons**

Geoff Parsons commenced his talk by asking firstly, "Has anyone ever wondered why some elements can occur in the native state in nature and other do not?" He then proceeded to explain how this will come about by reference to a number of charts showing the chemical reactions of elements in various differing oxidative, reductive and pH environments. He then moved on to demonstrate a few simple chemical reactions with apparatus and materials which he had brought to display.

The speaker initially described how a metallurgist would process minerals, using a variety of actions which would involve crushing, grinding applying magnetising or electrostatically charging, heating, melting or even vapourising etc.

Geoff had also prepared a chart showing the occurrence of elements as native metals. The yellow high-lighted panels indicated that the elements were represented in international publications and in Mindat and Fleischer. 'X' indicating no references. The other columns gave the number of photographs provided in Mindat, the crystal system and the type location if known. He pointed out that some of the elements had been found in meteorites and rocks from the Moon.

ELEMENTS THAT OCCUR IN THE NATIVE STATE AS "MINERALS"

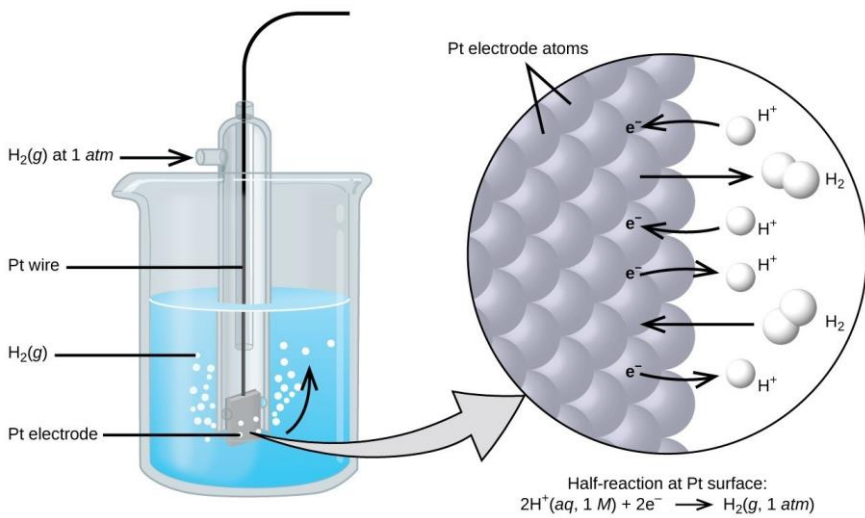
Common	Au, Ag, Cu, Pt group (Pt, Ir, Os, Pd, Rh, Ru)
Others	Bi, Fe, Sb, As, Pb, Se, Sn
Very rare	Cd, Cr, Ni, In, Ti, W, Al, V, Zn
Invalid or discredited	Nb, Re, Co, Mo, Ta

Less Common Native Metals						
In literature		Not in IMA list (X)	Not in Fleischer 2014 (X)	No. of photos in Mindat	Xtal system	Type Locality
Aluminium	Al			12	cub	Vilui, Siberia, Russia
Antimony	Sb			212	trig	<i>unknown</i>
Arsenic	As			399	trig	<i>unknown</i>
Bismuth	Bi			628	tig	<i>unknown</i>
Cadmium	Cd			2	hex	Vilyui, W Yakutia, Russia
Chromium	Cr			2	cub	Anduo dep, Dongqiao, Tibet
Cobalt	Co	X	X	1/-		<i>Russia</i>
Indium	In			1	tet	Orlovskiy, Etransbaikal, Russia
Lead	Pb			183	cub	<i>unknown</i>
Mercury	Hg			187	liq	Ephesos, Selcuk, Turkey
Molybdenum	Mo	X	X	1		<i>Moon -> Russia</i>
Nickel	Ni			3	cub	Bogota, n. Canala, New Caledonia
Niobium	Nb	X	X	1		<i>Moon</i>
Rhenium	Re	X	X	3		<i>Moon, meteorite</i>
Selenium	Se			122	trig	<i>unknown</i>
Tantalum	Ta	X	X	2		<i>Greenland, Russia</i>
Tin	Sn		X	14	tet	Miass R, S Ural, Russia
Titanium	Ti			9	hex	Luobusa Mine, Tibet
Tungsten	W		X	7	<i>iso</i>	<i>Bolshaya Poly R, Russia</i>
Vanadium	V		X	1	<i>iso</i>	<i>Colima volcano, Jalisco, Mexico</i>
Zinc	Zn			11/3	<i>hex</i>	Brunswick, Vic, Australia

Geoff Parsons moved on to show how difference in pH can occur in the natural environment which would contribute towards oxidative or reducing effects on minerals and may release elements as native metal from compounds containing the element. To demonstrate this process he set up a simple electrolysis apparatus to show a copper compound in solution being electrolysed to copper metal. The process was further explained by reference to diagrams showing the Standard Hydrogen Electrode and several charts describing the effects of eH-pH in various environments.

Conditions have to be sufficiently reducing to form "native metals" and maintain them in the metallic state. Some metals hate being by themselves so only exist in nature as compounds.

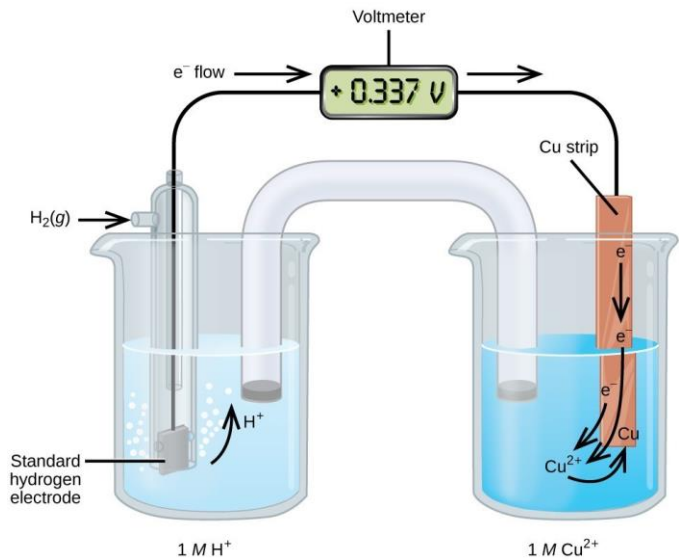
STANDARD HYDROGEN ELECTRODE (SHE)



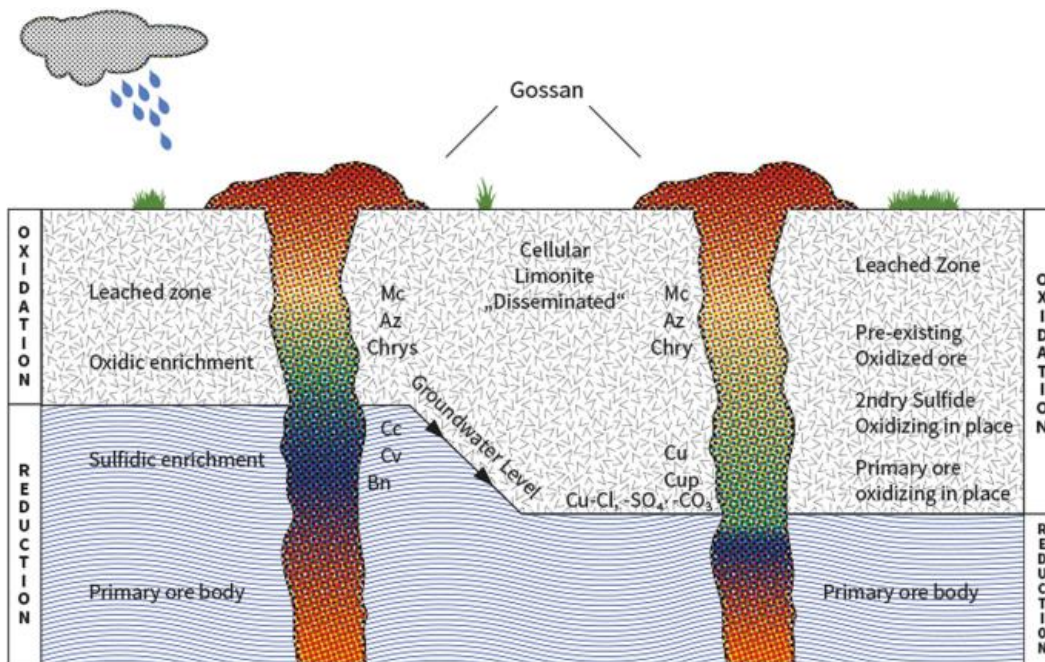
Bubbling hydrogen at 1 atm over a platinum electrode in the solution. This is the Standard Hydrogen Electrode (SHE) half cell and is designated as 0.00V.

TWO HALF CELLS COMPLETE THE OVERALL REACTIONS

H₂ is being oxidised to H⁺
 Cu²⁺ is being reduced to Copper metal.
 The two half cells are connected by a conductive salt bridge
 The voltage across the cells is 0.337V under standard conditions



CLASSIC ZONING OF ORE BODIES



At the end of his talk Geoff Parsons suggested that his subject had not been that difficult although had presented a fairly technical description of the effects of pH and eH in natural systems, of groundwater containing dissolved minerals, and the feature of native elements being produced from mineral compounds.

The President introduced the second speaker for the evening. Luis Martins has been resident in Australia for some two years and gave another lecture to the Society in July 2022 on 'A Mineral Collecting Trip to the Faroe Islands'.

‘Jáchymov: Wonder Mining Town in the Ore Mountains, Czech Republic’

Luis Martins

Jáchymov, (Czech pronunciation), or in German, Joachimsthal, is a small town of currently about 2,400 residents in the Karlovy Vary Region in the far west of the Czech Republic near the border with Germany. It is a spa town but with also a substantial mining history providing considerable interest to tourists.

Deposits of silver were discovered near the town in the early 1500s with mining of first mainly silver, then other metals and finally uranium. There are also a number of hot springs in the area including in Jáchymov itself and due to the mining history the whole area is known as the Erzgebirge/Krušnohoří Mining Region UNESCO World Heritage Site. Up until the First World War the Kingdom of Bohemia including Jáchymov was within the Austro-Hungarian Empire. Then the country of Czechoslovakia was created in 1918 and in 1992 was divided into the Czech Republic and Slovakia.



Jáchymov today

HISTORY:

From Humble Beginnings:

In the 13th to 14th century, a small settlement named Konradsgrün existed in the area of what we know today as Jáchymov. The region of the Krušné hory Mountains, (Erzgebirge), was strongly forested. There were few settlements due to the harsh climate and a short vegetation season made the region prohibitive for early farming settlers. However, there were some significant (for the time) mining towns nearby, - Schneeberg, Annaberg, Freiberg...

A Lucky Strike:

1512: An old (undated) adit was discovered and some minor silver was found, but nothing worth pursuing. 1516: Further work was done in the old adit where, by advancing the adit front only two meters forward, a very rich silver vein was found. This was named the Discovery vein (Fundgrubner). A “silver rush” followed, founding a settlement named first *Thal* (valley), to be re-named with much festivity in 1517 to *Thal des heiligen Joachims* (valley of the Saint Joachim), later modified to **Joachimsthal**.

The Silver Years:

Between 1516 and 1577, Joachimsthal was the main producer of silver in Europe, with an average profit of 30%, even when considering average silver losses of 25% due to the mining methods used. Silver masses up to 280kg in weight were found in the cementation zone. At the time of the highest silver output in 1534, Jáchymov was the second largest town in Bohemia and Saxony, counting 18,200 souls.

Cradle of Innovation:

A third stage of silver mining was started, marked by the introduction of new methods in mining mechanization, ore mining and water pumping, as well as a new mining law that stayed in place until 1854. There was an increased demand for silver due to a shortage of coin. There were sufficient numbers of miners, because mines in nearby Schneeberg were flooded in 1511, followed somewhat later by a decline of mining in Annaberg.

Georgius Agricola

Georg Bauer, (better known by the Latin form of his name, Georgius Agricola, 1494-1555), was a German polymath, with works in such diverse areas as humanism, mineralogy and metallurgy. He lived in Joachimsthal from 1527 to 1533, at the height of the silver boom. He then stayed for the rest of his adult life in the Erzgebirge, where he wrote his two most famous books, *De Natura Fossilium* and *De Re Metallica*.

De Re Metallica (1556) is a ground-breaking work on the topics of geology, prospecting, mining technology, and ore/metal refining. Its 244 woodcut plates were ground-breaking for the technical literature of the time. Most of the knowledge in the book comes from Agricola's time at the Erzgebirge, where the state of the art knowledge on geology and mining was being produced at a fast pace

The Thaler: 1518. An Abundance of Silver.

The first coin actually called a “*taler*” (an abbreviation of Joachimstaler) was minted in Joachimsthal, at the time part of the Holy Roman Empire, weighing roughly 29 g with a diameter of 40mm. The coin became incredibly popular in the region, and it was the longest-lived coin type of the Holy Roman Empire. The popular use of the name slowly transformed into *tolar*. The Spanish eight-real coin was similar in size to the taler, and became popularly named *dolar*. That name of the Mexican *dolar* became *dollar* in the USA in 1792, which was the first country to officially use the word. Today over twenty-five countries use the name dollar for their currency.

The Cobalt/Silver (and Bismuth) Years

By the end of the 16th century, the mining in Jáchymov was declining, as a consequence of exhausting the richest veins and an unfavourable political and economic situation compared to work. From 10,000 to 15,000 miners in 900 mines and prospects were employed during the mining boom, but only 70 miners were employed by 1613. The total silver production in Jáchymov during the 16th century, (1500s), is estimated at 200 to 300 tons. During the period 1631 to 1655 the total production was only 838 kg. The minting of coins in Jáchymov was terminated approximately in 1671.

Towards the beginning of the 17th century, mining in Jáchymov turned to other metals besides silver. The first mill producing cobalt colour started operation in 1611. Profit from production of this colouring agent was near 60%. Bismuth mining also increased, the metal was in demand until 1873 and 1894, when imports of cheap bismuth from America brought prices down.

The 3rd Age: Uranium

From 1845, uranium became the main focus of the mining and prospecting in Jáchymov. Three main periods can be identified:

Uranium for use as a colouring agent (roughly 1845 to 1900)

Several uranium compounds were used as colourants, mainly for glass and porcelain. Some of these can still be found in antique stores around the world.

Uranium mining to extract Radium (1898 to 1930's)

The discovery of radioactivity in 1896 by Becquerel and the discovery of polonium and radium by Marie Skłodowska-Curie and Pierre Curie in uranium-bearing material from Jáchymov heralded a new period of interest in the district from 1900 onwards. The Curies ordered 10 tons of refuse material from the Jáchymov uranium colour factory in 1898 as the raw material from which they extracted the new elements.

The first works utilized the colour factory refuse material for production of radium compounds. First recorded radium production in the factory is dated 1909. Until 1913, it held a monopoly for radium salts, which was bringing important income to the government of the Austrian-Hungarian Empire. In 1913, income for this commodity exceeded 1 million gold coins. Concurrently with processing of refuse material of the colour factory (until 1924), mining and dressing of uranium ores continued for colour production and for radium extraction.

The competition by producers in the USA, felt since 1914, and especially processing of Congo ores in Belgium (since 1923), resulted in quantities of relatively cheap radium. This brought the Jáchymov mines again into a difficult situation. After the annexation of the Sudetenland including Jáchymov in 1938 to Germany and then the annexation of the whole country, the uranium mines as the former property of Czechoslovakia became the property of Nazi Germany. Total production: 100 grams (!!!)

Uranium for nuclear purposes (1945 to 1964: 1992)

On June 14, 1945, representatives of the Czechoslovak Republic took over the property of Jáchymov mines. Since 1950, new shafts provided access to veins of the majority of mining fields. Unlike in the historical periods, even the deepest parts were exploited and the veins were followed downwards to the granite floor. A gradual decrease in mining started in 1959, as individual mining fields were completely exploited, with the final works closing in 1964.

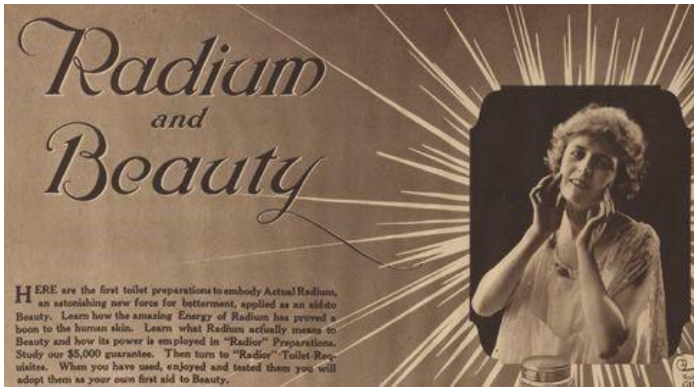
During the years 1946 to 1964, 9600 m of shafts, 180 km of vertical ore chutes and 855 km of horizontal adits were excavated and a total of 6,550,000 m² of veins (in projection on the wall) were exploited. Total mining exploitation (including U extracted + loss) reached 7950 tons of uranium.

The Hot Springs

In 1905 the high radioactivity of some of the local springs was discovered and in 1906 the first radioactive spa opened. Several luxury spa's and hotels flourished before WWII and two Radium Spa Hotels are still open today



A number of products containing radium and supposedly promoting health or appearance improvement were marketed in the 19th and early 20th centuries.



Geology

The Main Geological Features:

E-W trending Klinovec antiform, with additional lower order folds. (Klínovec, (Czech spelling), is the highest peak of the Ore Mountains). Upper carboniferous granites intrude the metamorphic rocks, and include significant fault zones and some greisen. A significant suite of dikes is associated with the granitic pluton: granite porphyry, prophyrites, aplites, pegmatites and lamprophyres. Tertiary magmatic rocks due to the Oligocene-Miocene volcanic phase in Bohemia: alkali basalts, tuffs, volcanic breccias and trachytes.

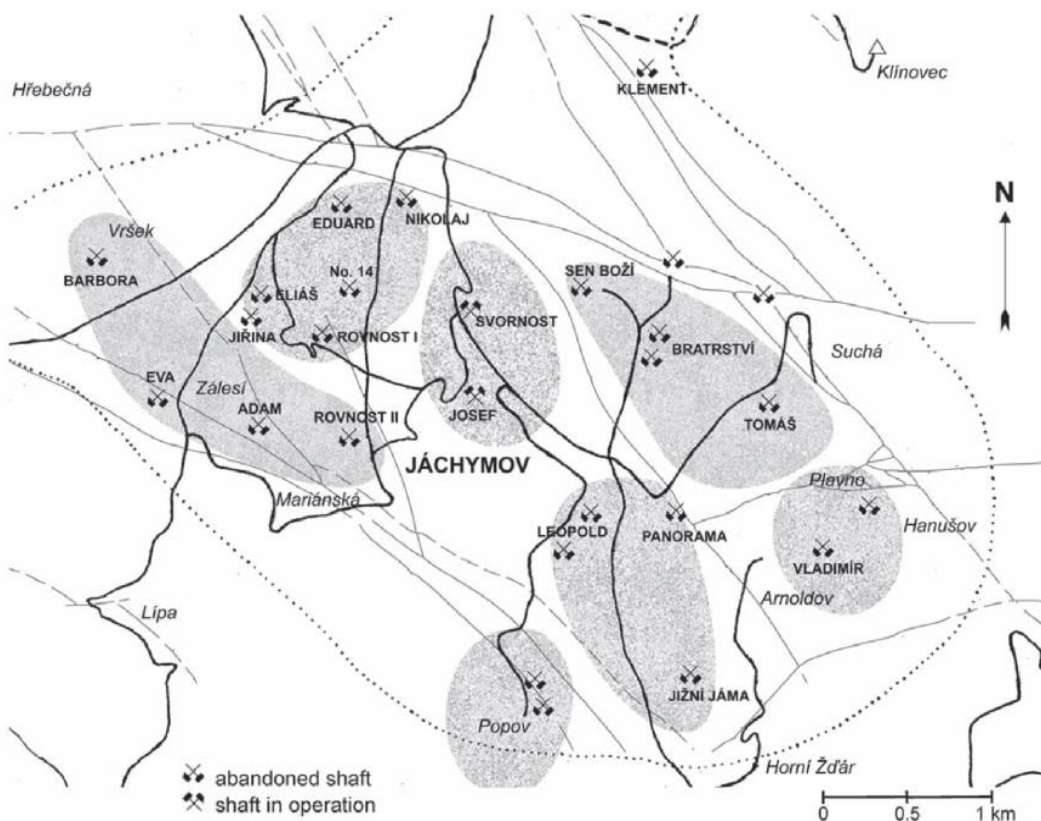
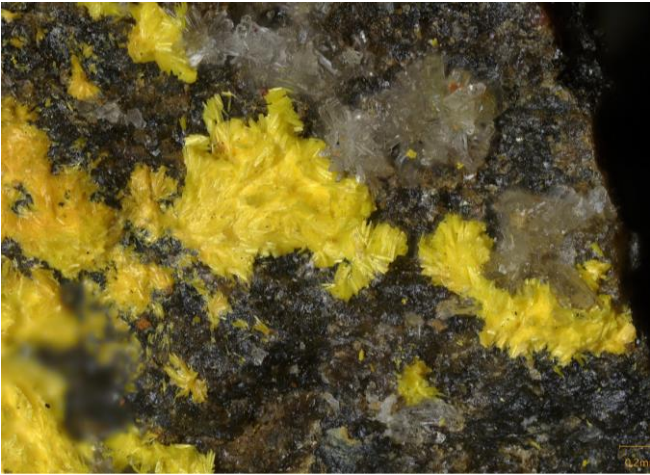


Fig. 25. Simplified map of location of the six main ore clusters (+ Popov cluster) in the Jáchymov ore district. Faults are shown by thin full and dashed lines.

Numerous mine shafts and workings around Jáchymov

The Minerals

As would be expected with a major mineral deposit there is a large suite of minerals that have been recorded from the Jachymov mining district. Mindat (as of 01/03/2024) lists 375 valid minerals with 52 type-locality minerals and at least 24 unnamed or poorly studied species. Images of a small selection of these were displayed by the speaker.



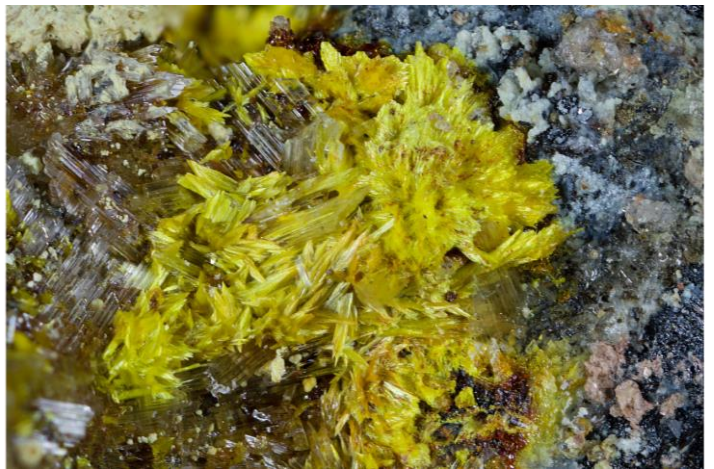
Jáchymovite, Uranium sulphate FOV 3mm © Joy Desor



Babánekite, (Copper Arsenate) FOV 3mm © Pavel Skacha



Argentopyrite FOV 7mm. © Uwe Haubenreisser



Zippeite, (Potassium Uranium Sulphate). FOV 7mm © Bohuslav Bures

FORTHCOMING EVENTS

GEMBOREE 2024

The 60th Gemboree, the National Gem & Mineral Show, will be held over Easter – from the 29th of March to the 1st of April in the Railway Terrace Park, Willunga, South Australia
For more information: www.gemboree2024.com.au.

The NATIONAL GEM & CRYSTAL EXPO 2024

The National Gem & Crystal Expo is being held over the weekend of the 20th and 21st of April in the Hawkesbury Indoor Stadium on Greenhills Way, off Stewart Street, South Windsor.

ILLAWARRA LAPIDARY CLUB Inc –Open Day Sunday 5 May, 9am to 2pm
At 51 Meadow Street, Tarrawanna

‘Club members selling Mineral Specimens, Fossils, Lapidary Materials, Jewellery & more. Morning Tea (proceeds to the Cancer Council’s Biggest Morning Tea) and Sausage Sizzle Lunch available.

You can find us at our website <https://www.illawarralapidaryclub.com.au> or like and follow us on Facebook: <https://www.facebook.com/IllawarraLC>’

The LISMORE GEMFEST 2024 is being held in the Lismore Showgrounds
Sat 18th May: 9am – 5pm. Sun 19th May: 9am – 3pm
Entry: \$5 Adults. \$1 Children (12 years & under).

Sales: Gem, Mineral, Jewellery & Lapidary dealers, Minerals, fossils, jewellery, rough & cut gemstones, crystals.

Website: <https://lismoregemfest.com.au/>. Facebook: <https://www.facebook.com/LismoreGemfest>
Email: lismore.gemfest@gemclublismore.org.au



LISMORE GEMFEST  **Lismore Showgrounds**
18th May 9am - 5pm
19th May 9am - 3pm

JEWELLERY, FOSSILS, KIDS ACTIVITIES, CRYSTALS, GEMSTONES, FOOD STALLS
ADMISSION: ADULTS \$5, CHILDREN \$1

\$1400 
IN LUCKY GATE PRIZES

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