STONEY STATEMENTS

A monthly publication of the Clear Lake Gem & Mineral Society

VOLUME 47 | October 2021 | NUMBER 10

NEXT MEETING: **TUESDAY, October 19, 2021**

TIME: **7:00 p.m.**

LOCATION: League City Library
100 W Walker St,
League City, TX 77573

INSIDE THIS ISSUE

OCTOBER MONTHLY MEETING

Our October meeting will be at the League City Library - **Tuesday**, **October 19, 2021 at 7:00 pm.**

We will have a guest speaker:
Kim Christiansen – Caves in France.

We will have a swap session – bring in your unwanted or extra rocks, fossils or jewelry that you want to trade in and hopefully you will get something that you want.

http://www.clgms.org/

MINUTES OF THE September CLGMS GENERAL MEETING (9/21/2021)

Guest Speaker: Dr. Georgina Kramer

Topic: Do you know the moon well enough? She spoke about the moon and gave us an overview the facts during her presentation.

Charlie fixed the Genie and needs a "Slab saw" to go with it it's going to be a 6-inch saw. He will get the price for it before next meeting.

Rockhound Estate Sale: A member is selling their items and if you would like more information here is his email address: john; cbc194@yahoo.com for a time and date to meet with him.

October's Guest Speaker: Kim-Caves in France

MINUTES OF THE October CLGMS BOARD MEETING.

Not much of a discussion because a lot of Board members were not present (vacations and personal business)

Our next show will be February 26-27, 2022.

Upcoming events - We are looking forward to the following programs.

We will have a swap session – please bring your extra collections of rocks, fossils or jewelries and swap them so you can have a new collections.

Please check out our Facebook page: **Clear Lake Gem and Mineral Society.**

Field Trips Announcement

Currently – no field trips are scheduled.

If you have a good location for our club field trip – please contact:
annabel.brownfield@gmail.com or call/text: 281-486-1866.

Gemstones Deposits of Minas Gerais, Brazil

Bob Linnen - University of Waterloo, Canada: https://uwaterloo.ca/wat-on-earth/news/gemstone-deposits-minas-gerais-brazil

Introduction

Brazil produces the greatest variety of gems and semi-precious stones in the world, including diamonds, emeralds and amethyst. Mining is very much a part of the Brazilian culture and prospecting is a way of life for many people. If a mineral deposit is found in an area where no exploration license has been granted then prospectors, called garimpeiros, can mine the area using manual tools to extract the minerals. Of course many of the mines in Brazil are modern operations, owned by mining companies, similar to Canada.

Some of the most spectacular gems come from the region near the city of Belo Horizonte, in the state of Minas Gerais. This area produces emerald, aquamarine, rubellite (pink tourmaline), green tourmaline, imperial topaz, alexandrite and amazonite. These gems are commonly associated with pegmatites and several of these deposits were the subject of a field trip sponsored by the 31st International Geological Congress in 2001. This article will first provide some background on the origin of pegmatites, then look at some specific deposits and how they came to contain gems.

Figure 1. Ipe pegmatite with large orthoclase (K-feldpar) and mica crystals. Note the size of the people for scale.

What are Pegmatites?

Strictly speaking pegmatites are not actually a type of rock, but instead are the description of a texture. This texture is a rock with variable crystal sizes including some very large crystals'. Generally these rocks are igneous in origin and are most commonly granitic in composition. An example of how large the crystals can be is shown by Figure 1, where the K-feldspar (potassium-feldspar) crystal is roughly 3m long and the beryl in Figure 2 is about 0.7 m across. The origin of pegmatite and the explanation of how crystals grow so large are controversial. However, the most widely accepted origin is that the crystals grow from water-rich melts, that are also rich in fluxing elements (elements that lower the melting temperature of silicate minerals) such as boron, fluorine and phosphorous. The high concentrations of these fluxing elements also increases diffusivities in the melt, allowing cations to move more quickly to sites of growing crystals, and this results in the growth of very large crystals. The question of why some pegmatites contain gems whereas others do not is also the subject of debate. Part of the

explanation is that the gems emerald, aquamarine and alexandrite are beryllium minerals, tourmaline is a boron mineral and gem quality tourmaline also contains lithium, and topaz a fluorine mineral. These elements do not easily substitute into the major rock-forming minerals (quartz, feldspar, biotite etc.), therefore granitic melts that have undergone extensive crystallization will have high concentrations of the gem elements' lithium, beryllium, boron and fluorine, as well as rare metals' which also do not easily substitute into crystals, e.g., tantalum, niobium and tin. It is important to note that not all elements build in concentration in the melt as minerals crystallize. Many elements, such as chromium readily substitute into certain minerals and thus crystallization will result in the impoverishment of these elements. It will be shown below that Cr is in fact very important to the formation of many gem deposits, so extensive crystallization alone will not result in the formation of a gem pegmatite.

The Colour of Gemstones

There are several reason why gemstones have their colour. The gem industry commonly heat treats or irradiates minerals to impart or enhance colour in minerals. Naturally occurring colour is usually due to the presence of impurities. The green colour of emerald is the result of chromium and/or vanadium, green in tourmaline is also due to chromium, whereas aquamarine owes its colour to iron and rubellite's pink colour is likely due to the presence of magnesium. Alexandrite (gem variety of chrysoberyl) is one of the rarest gems and is unusual in that it changes colour. It is green in natural or fluorescent light and is red in incandescent light. Alexandrite also owes its colour to the presence of trace amounts of chromium.

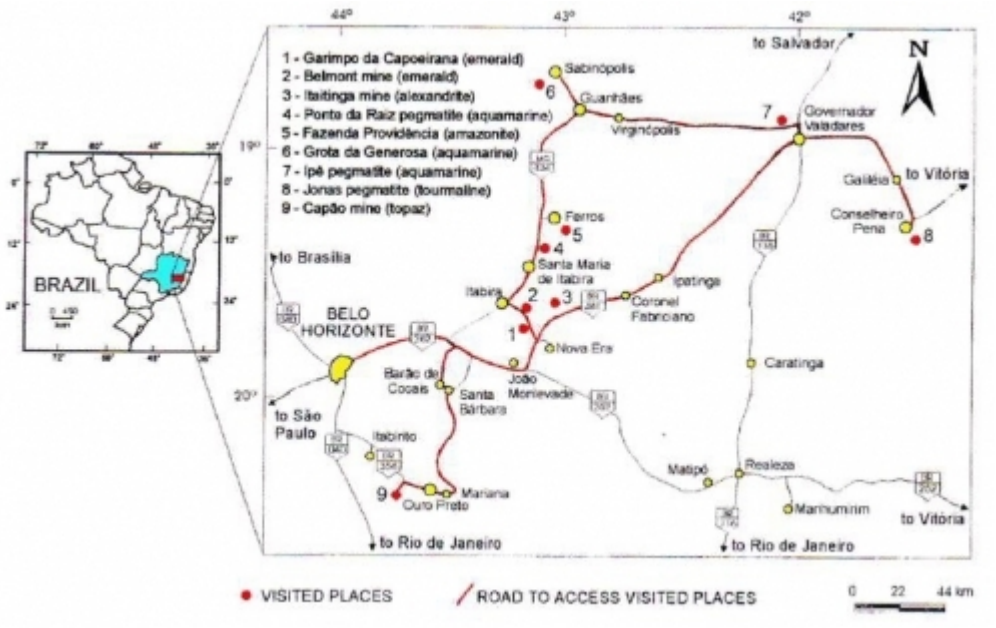

Figure 2. Locations of selected gem deposits in Minas Gerais (from Cesar-Mendes, 2000).

Gem Deposits

The geology of Minas Gerais in brief can be simplified to a core of Precambrian basement (S‹o Fransisco craton) surrounded by Neoproterozoic mountain belts (Brasiliano orogeny). Most of the pegmatites are associated with the Brasiliano event, 700 to 450 million years ago. Brazil also experienced major uplift during the opening of the South Atlantic during the Cretaceous, 124-89 million years ago, then extension during the Tertiary. The famous imperial topaz of Oro Preto is likely related to this uplift and extension. The locations of some of the gemstone deposits in Minas Gerais are shown by Figure 2.

Emerald Deposits

The discovery of the Capoeirana garimpo is a classic case of a lucky person being at the right place at the right time. This person was observing two bulls fight each other on the Capoeirana farm. One of the bulls missed goring the other and stabbed the ground with its horn, exposing a green crystal in the red soil that turned out to be emerald. The emeralds here, and at the nearby Belmont mine are found in ultramafic biotite schists. The emeralds are in quartz veins cutting the schists (Figure 3), or in the schists adjacent to the veins. The ultramafic host is important because these rocks have the high Cr contents that is necessary to form emerald. The source of Be is not well understood, but potentially was from derived from fluids that emanated from pegmatites in the area.

Alexandrite Deposits

Alexandrite is mined in alluvium at the Itaitinga deposit. On average only 250 carats per month are produced. About 55-65% of this weight is lost in cutting, but the best quality stones are worth up to 3500 $US/carat. The alexandrite is recovered from a gravel horizon that also contains emerald, aquamarine, chrysoberyl. This suggests a pegmatite source for the alexandrite. Exploration in the area has also discovered alexandrite crystals associated with ultramafic biotite schists that are cut by pegmatite dykes. Thus the origin of alexandrite deposits involves the interaction of a beryllium source, pegmatites, with chromium-rich rocks, ultramafic biotite schists, similar to emerald deposits.

Figure 3. Emerald in quartz vein cutting utlramafic biotite schist

Aquamarine and Tourmaline

The Grota da Generosa pegmatite is an important aquamarine deposit, and also a producer of feldspar for the ceramic industry and of industrial beryl for beryllium. Since

the colour of aquamarine is derived from iron, the origin of this gem pegmatite does not involve ultramafic rocks, in contrast to emerald and alexandrite. This pegmatite is zoned and Figure 4 shows a large beryl crystal at the contact between the mica-rich contact zone (above) and quartz-feldspar zone (below). The Jonas pegmatite is no longer in production but it was perhaps the most important producer of gem tourmaline (rubellite) in the world. Of note, four large crystals were found in pockets. These crystals were named: Joaninha, Roguete, Tarugo and Flor-de-Liz and they weighed 325, 135, 80 and 32 kg, respectively. Figure 5 is a photo of the Forguete rubellite, which sold for $US 9 million.

Coloured Gems In Canada

From the description of the gems of Brazil, Canadians might easily wonder "why are there no coloured gemstones in Canada?". Considering that the discovery of diamonds in Canada is very recent, the answer to this question might be "because we haven't looked hard enough". There are some occurrences of rubellite and emerald in northern Ontario and emeralds have recently been discovered in the Yukon.

Figure 4.

Large beryl crystals, up to 0.7m across, at the Grota da Generosa pegmatite.

Figure 5.

The Foruete rubellite crystal was found in the Jonas pegmatite by the garimpeiro Ailton Barbosa. It is 1.07m long, weights 125kg, and was sold for $US 9,000,000. (from Cesar-Mendes, 2000).

SCFMS and MEMBER CLUB GEM SHOWS			
Sept: **Lubbock Gem and Mineral Society** **10/25-26/2021** **Sat: 10 am – 6 pm** **Sun: 10 am – 5 pm** **Lubbock Memorial Civic Center.** **1501 Mac Davis Ln.** **Lubbock, Tx**	**Oct:** **Tri-City (Temple, TX)** **10/22-23/21** **G&MS of LA (New Orleans, LA)** **10/9-10/21** **Austin (Austin, TX)** **10/22-24/21** **Cowtown-CERA (Ft Worth, TX)**	**Nov** **Golden Spread Gem, Mineral and Treasure** **Nov 6 and 7, 2021** **(Amarillo, TX)** **Paleontological Society(Austin, TX)** **11/06-07/21** **Midland (Midland, TX)** **Houston Gem and Mineral Society.** **Humble Civic Center** **11/12-14/21** **Dallas (Dallas, TX)** **11/20-21/21**	**Dec:** **DeRidder (Leeville, LA)**

STONEY STATEMENTS
Clear Lake Gem and Mineral Society, Inc

PO BOX 891533
Houston, Texas 77289

Meeting 3rd Tuesday of the Month
7:00 P.M.
League City Library
100 W Walker St, League City, TX 77573

Member of

Next Annual Show
February 26-27, 2022
Pasadena Convention Center

CLGMS is on the Web:
http://www.clgms.org

FACEBOOK: CLEAR LAKE GEM AND MINERAL SOCIETY.

American Federation of Mineral Societies

South Central Federation of Mineral Societies

Clear Lake Gem and Mineral Society, Inc

MEMBER: American Federation of Mineralogical Societies and South Central Federation of Mineral Societies

PURPOSE: To promote education and popular interest in the various earth sciences; in particular in those hobbies dealing with the art of lapidaries and the earth sciences of minerals, fossils and their associated fields.

2021 OFFICERS:	President	John Caldyne	832-282-4270
	Vice President	Cynthia McGowan	281-546-2662
	Secretary	Christina Rankin	281-723-5408
	Treasurer	Morgan Davies	281-224-2444
	Program Director	VACANT	
	Board of Directors:	Sandra Christiansen	Jerry Newberry
		Jim Edwards	Jim Hawkins
		Donna Nelson	
	Newsletter Editor	Sara Tanner	
		David Tjiok	

Annual Show 2021 …….. Sandra Christiansen
Constitution & Bylaws……..Sara Tanner
Community Benefits……..Charlie Timme
Historian……David Tjiok
Publicity……..…… Annabel Brownfield
Facebook……Cynthia McGowan

Membership……David Tjiok
WWW System Admin.. …….Mike Flannigan
Refreshments……..John Caldyne
Education/Field Trips…….Annabel Brownfield

Membership Dues Jan. to Dec. 2021: Adult $15:00, $5.00 per additional adult at same address, Junior $5.00, $5.00 per member with adult at same address, Family Dues $20.00 (4+) at same address. Send Dues to CLGMS, PO BOX 891533, Houston, TX, 77289