FORSYTH GEM AND MINERAL CLUB, INC.

Nature's Treasures

April 23, 2020

****** Public Version ******

MEETING: **Due to the ongoing Covid-19 (Coronavirus) situation and lockdown, FGMC meetings are suspended indefinitely.**

Covid-19 / Coronavirus Notice

At this time, due to the statewide "stay-at-home" orders and other issues, all activities of FGMC are temporarily suspended.

Newsletters will continue to come out and once the lockdown is lifted and other activities can resume, the newsletter will contain the associated information.

Dates To Remember:

September 11 – 13, 2020 – Annual Show

Staying Connected

In these days of "stay-at-home" (lockdown) orders, it is easy to get frustrated with life in general, and in trying to find things to occupy our time as well.

Ken Reed offered up the following advice as a way for members to at least stay in touch with the hobby during these times:

I must confess to having been won over by technology (horrors, perish the thought!) but I am now on Facebook. It may be beneficial to let members know that there are several groups on Facebook who discuss, post photos, sell/trade, and otherwise engage in our hobby thru this medium. I have found it to be enjoyable since gemshows in our area have been cancelled (as well as our meetings). I was not aware of the amount of info or number of people that was available online.

I "joined" our club Facebook site and then these started to come up as "groups you may be interested in". Don't really have links, just connected with them thru getting on Facebook.

William Holland Cancelled / Wildacres Still Tentatively Open

Those of you who have been members for several years know that this is the time of the year that the newsletter often promotes the SFMS workshops at William Holland (GA) and Wildacres (NC). These workshops offer week-long classes in various lapidary arts, including room and board under a single, very reasonable price. Members who have attended in the past have providing glowing reports on the experience.

However, due to the ongoing Covid-19 situation SFMS has cancelled the William Holland session scheduled for June.

The Wildacres sessions, Aug 17-23 and Sept 14-20, are still tentatively on.

Anyone interested can get more information at: https://www.sfmsworkshops.org/

April DMC Trip Cancelled

Although it was originally hoped that this trip could proceed, since it is on private property, the statewide "stay-at-home" orders have overridden this and the trip has been cancelled.

Reviewing: Tourmaline

From Geology.com/minerals

Earth's most colorful mineral and gem material.

Article by: Hobart M. King, Ph.D., RPG

What is Tourmaline?

"Tourmaline" is the name of a large group of boron silicate minerals. These minerals share a common crystal structure and similar physical properties - but vary tremendously in chemical composition. The wide range of compositions and color zoning within crystals causes tourmaline to occur in more colors and color combinations than any other mineral group.

Tourmaline is one of the world's most popular gemstones and it serves as a birthstone for the month of October. Because of its popularity, tourmaline is easy to find in jewelry stores. Well-formed tourmaline crystals are also valued by mineral specimen collectors. Specimens with attractive colors and crystal forms can sell for thousands of dollars.

Geologic Occurrence of Tourmaline

Tourmaline most commonly occurs as an accessory mineral in igneous and metamorphic rocks. Large, well-formed crystals of tourmaline can form in cavities and fractures during hydrothermal activity. Tourmaline is a hard and tenacious mineral. That enables it to persist during stream and beach transport as durable grains in sediments and sedimentary rocks.

Tourmaline Crystals in Fractures, Voids, Pockets

The most spectacular tourmaline crystals are formed by hydrothermal activity. These crystals form when hot waters and vapors carry the elements needed to form tourmaline into pockets, voids, and fractures, which offer an open space for crystal growth. The tourmaline crystals formed in these cavities range in size from tiny millimeter crystals to massive prisms weighing over 100 kilograms.

One rich pocket of nice tourmaline crystals can yield mineral specimens and gem materials worth millions of dollars. Many mineral collectors and gem hunters have become wealthy by discovering just one of these treasure-filled cavities.

Alluvial Tourmaline

Tourmaline has a Mohs hardness of 7 to 7 ½, and that hardness makes it a durable sediment granule. Tourmaline is also relatively resistant to chemical weathering. So, particles of tourmaline weathered from igneous or metamorphic rocks can persist in a stream and can be transported long distances from their source area.

Tourmaline gem rough is mined from stream sediments in many parts of the world, often by artisanal miners. It generally occurs as small granules and pebbles that that have been rounded by the abrasion of stream transport. Tourmaline is often one of many different minerals produced from a single mining location.

Tourmaline as an Accessory Mineral

The most common occurrence of tourmaline is as an accessory mineral in igneous and metamorphic rocks. It often occurs as millimeter-size crystals scattered through granite, pegmatite, and gneiss. In this mode of occurrence, tourmaline rarely makes up more than a few percent of the rock's volume. The variety of tourmaline most often found as an accessory mineral is black schorl.

Tourmaline Sources

Brazil has been the world's leading source of tourmaline for nearly 500 years. In the 1500s Portuguese explorers obtained green and blue tourmaline from indigenous people and from panning streams in search of gold. They thought that these colorful stones were emeralds and sapphires and sent them back to Portugal, where they were cut into gems and used to make jewelry for royalty and wealthy citizens. (Tourmaline was not recognized as a distinct mineral until 1793.)

Beginning in the late 1800s, a steady stream of tourmaline discoveries have been made in the pegmatite deposits of Minas Gerais, Brazil. Since then, millions of carats of tourmaline have been produced in a wide range of colors, including much bicolor material. This diverse stream of tourmaline from Brazil has been the most important source for the worldwide gem and jewelry market.

The first commercial gemstone mine in the United States followed an 1821 discovery of tourmaline near the town of Paris, Maine. Over the past 200 years, significant amounts of pink and green tourmaline have been produced from dozens of Maine localities.

The most important source of tourmaline in the United States has been the tourmaline mines of southern California. Tourmaline has been mined there since the late 1800s. On the basis of cumulative dollar value, tourmaline has been the most important gem material mined in California. Most of this production occurred over 100 years ago in Riverside and San Diego Counties. Tons of red tourmaline was mined there and shipped to China, where it was used to make snuff bottles, carvings, jewelry and many other items. Today, a little tourmaline is being produced by small-scale mining. The miners today sell much of their best production as mineral specimens.

Today, discoveries of tourmaline of various kinds are made in Afghanistan, Mozambique, Namibia, Nigeria, Pakistan, Tanzania, the United States and other countries. These provide the market with a constantly changing supply of gem tourmaline and mineral specimens.

Physical Properties of Tourmaline

Chemical Classification	Boron silicate
Color	Black is the most common color. Also occurs in blue, green, yellow, pink, red, orange, purple, brown, and colorless. Single crystals are often zoned.
Streak	White when softer than the streak plate. Colorless when harder than the streak plate.
Luster	Vitreous
Diaphaneity	Transparent to translucent to nearly opaque
Cleavage	Indistinct
Mohs Hardness	7 to 7.5
Specific Gravity	2.8 to 3.3
Diagnostic Properties	Lack of visible cleavage, prismatic crystals with rounded triangular cross-sections that are often striated, vibrant colors, pleochroism.
Chemical Composition	(Ca,Na,K,[vacancy]) (Li,Mg,Fe+2,Fe+3,Mn+2,Al,Cr+3,V+3)3 (Mg,Al,Fe+3,V+3,Cr+3)6 ((Si,Al,B)6O18) (BO3)3 (OH,O)3 (OH,F,O)
Crystal System	Hexagonal
Uses	A popular gemstone and mineral specimen

Tourmaline has a few properties that can aid in its identification. If you have a tourmaline crystal, identification should be easy.

Tourmaline has a prismatic crystal habit and often has obvious striations that parallel the long axis of a crystal.

Tourmaline crystals often have triangular or six-sided cross-sections with rounded edges.

Tourmaline crystals are often color zoned through their cross-sections or along their length.

Tourmaline can be pleochroic with the darkest color viewing down the C-axis and lighter color viewing perpendicular to the C-axis.

Don't despair if your suspected tourmaline is an accessory mineral in an igneous or metamorphic rock. It often occurs in these rocks as tiny prismatic crystals. Get a hand lens and look for striations and rounded cross-sections.

Tourmaline has indistinct cleavage, so any specimen with obvious cleavage is probably not tourmaline. Color might not be helpful. The most common tourmaline color is black, but the mineral occurs in all colors of the spectrum.

Tourmaline Chemistry

Tourmaline is a complex boron silicate mineral with a generalized chemical composition of:

XY3Z6(T6O18)(BO3)3V3W

Letters in the formula above represent positions in the atomic structure of tourmaline that can be occupied by ions listed below.

X = Ca, Na, K, [] ([] = vacancy)

Y = Li, Mg, Fe+2, Fe+3, Mn+2, Al, Cr+3, V+3

Z = Mg, Al, Fe+3, V+3, Cr+3
T = Si, Al, B
V = OH, O
W = OH, F, O

Tourmaline Group Minerals	
[] = vacancy	
Mineral	**Composition**
Adachiite	CaFe3Al6(Si5AlO18)(BO3)3(OH)3OH
Bosiite	NaFe3(Al4Mg2)Si6O18(BO3)3(OH)3O
Chromium-dravite	NaMg3Cr6Si6O18(BO3)3(OH)3OH
Chromo-alumino-povondraite	NaCr3(Al4Mg2)Si6O18(BO3)3(OH)3O
Darrellhenryite	NaLiAl2Al6Si6O18(BO3)3(OH)3O
Dravite	NaMg3Al6Si6O18(BO3)3(OH)3OH
Elbaite	Na2(Li3,Al3)Al12Si12O36(BO3)6(OH)6(OH)2
Feruvite	CaFe3(MgAl5)Si6O18(BO3)3(OH)3OH
Fluor-buergerite	NaFe3Al6Si6O18(BO3)3O3F
Fluor-dravite	NaMg3Al6Si6O18(BO3)3(OH)3F
Fluor-elbaite	Na2(Li3,Al3)Al12Si12O36(BO3)6(OH)6F2
Fluor-liddicoatite	Ca(Li2Al)Al6Si6O18(BO3)3(OH)3F
Fluor-schorl	NaFe3Al6Si6O18(BO3)3(OH)3F
Fluor-tsilaisite	NaMn3Al6Si6O18(BO3)3(OH)3F
Fluor-uvite	CaMg3(Al5Mg)Si6O18(BO3)3(OH)3F
Foitite	[](Fe2Al)Al6Si6O18(BO3)3(OH)3OH
Lucchesiite	Ca(Fe)3Al6Si6O18(BO3)3(OH)3O
Luinaite-(OH)	(Na,[])(Fe,Mg)3Al6Si6O18(BO3)3(OH)3OH
Magnesio-foitite	[](Mg2Al)Al6Si6O18(BO3)3(OH)3OH
Maruyamaite	K(MgAl2)(Al5Mg)Si6O18(BO3)3(OH)3O
Olenite	NaAl3Al6Si6O18(BO3)3O3OH
Oxy-chromium-dravite	NaCr3(Mg2Cr4)Si6O18(BO3)3(OH)3O
Oxy-dravite	Na(Al2Mg)(Al5Mg)Si6O18(BO3)3(OH)3O
Oxy-schorl	Na(Fe2Al)Al6Si6O18(BO3)3(OH)3O
Oxy-vanadium-dravite	NaV3(V4Mg2)Si6O18(BO3)3(OH)3O
Povondraite	NaFe3(Fe4Mg2)Si6O18(BO3)3(OH)3O
Rossmanite	[](LiAl2)Al6Si6O18(BO3)3(OH)3OH
Schorl	NaFe3Al6Si6O18(BO3)3(OH)3OH
Tsilaisite	NaMn3Al6Si6O18(BO3)3(OH)3OH
Uvite	CaMg3(Al5Mg)Si6O18(BO3)3(OH)3OH
Vanadio-oxy-chromium-dravite	NaV3(Cr4Mg2)Si6O18(BO3)3(OH)3O
Vanadio-oxy-dravite	NaV3(Al4Mg2)Si6O18(BO3)3(OH)3O

The complex formula and many substituting ions produce the large number of minerals in the tourmaline group. The International Mineralogical Association has recognized 32 different tourmaline minerals based upon the chemical composition of solid solution series end members. These minerals are listed in the table below.

Names Used for Tourmaline Gems

A table above lists the names and chemical compositions for 32 different members of the tourmaline mineral group. These names are based upon the chemical composition of the mineral. Because it can be impossible or impractical to determine the chemical composition of a large number of specimens or even a single specimen, the generic name "tourmaline" is typically used for any mineral in the tourmaline group in the field, the classroom, the office, or even in a laboratory.

Tourmaline is one of the most popular gemstones because it occurs in every color of the spectrum. Jewelers and gemologists use trade names for different colors of tourmaline to simplify communications with their customers. These names work much better in a jewelry store than the mineralogical names in the table above!

Red tourmaline is sold as "rubellite".

Blue tourmaline is sold as "indicolite".

Green tourmaline colored by chromium or vanadium is often sold as "chrome tourmaline".

Black tourmaline is sold as "schorl".

For other tourmaline colors, the name of the color is usually used as an adjective. For example, "pink tourmaline" or "purple tourmaline." "Yellow tourmaline" is sometimes sold as "canary tourmaline".

"Color names" make the language of tourmaline gems simple for jewelry consumers. If jewelry stores sold tourmaline gems by their scientific names, the chemical composition of each gem would need to be determined to assure that the names used to offer them for sale were absolutely accurate. This would create confusion, waste time and be an enormous expense. Tourmaline would not be as popular!

"Paraiba" - The Most Valuable Tourmaline

The name "Paraiba" perks up the ears of people who like tourmaline. In 1989 and 1990, spectacular bright blue to bright green elbaite tourmaline, colored by trace amounts of copper, was found in pegmatite pockets at mines in the states of Paraiba and Rio Grande do Norte, Brazil. Later, violet specimens containing traces of both copper and manganese were found. The color of these gems was remarkable. Many people began to describe them with adjectives such as "electric" and "neon" because the colors were so saturated and vivid.

The material was informally called "Paraiba" after the locality. The beautiful gems were soon selling for over $2000 per carat, and news about them spread throughout gemstone markets. People loved the gems, their colors, and their exotic name. Prices for faceted gems of the highest quality material in sizes over one carat escalated to over $10,000 per carat. "Paraiba" quickly became the most popular and most valuable tourmaline.

The initial rage over these gems was all about the character of their color. Soon, people anxious to cash in were using the name "Paraiba" for any tourmaline found in the state of Paraiba - hoping that it would boost the price of what they were selling. Gems of similar appearance were found in Nigeria in 2001 [3], and some people immediately applied the name to them - again in the hope that it would boost their value. More were discovered in Mozambique in 2005. [3] People with blue or green tourmaline from many parts of the world wanted to sell their material at a "Paraiba price" - but should these gems be called "Paraiba"?.

A 2006 article in Gems & Gemology reported that "the Nigerian and Mozambique tourmalines with the saturated blue-to-green colors cannot be distinguished from the Brazilian material by standard gemological testing," however, trace element analysis could be used to separate the Brazilian, Nigerian, and Mozambique tourmalines.

So, what is the real "Paraiba"? A good answer might be similar to "What is a real 'Burmese ruby'?" It is a gem of finest appearance from a specific locality (Burma, known today as Myanmar) - and some people are willing to pay a lot extra for them. That is why rubies from Madagascar with a similar appearance do not sell for a "Burmese" price. One should not assume that a name, a locality, or a color automatically produces value in a gem.

Keep that in mind if a vendor offers you "Paraiba tourmaline".

If you own or are considering the purchase of a "Paraiba tourmaline", first, remember that spectacular color is what started the rage over these gems. Make sure you are buying spectacular color. Next, many people are willing to pay more for gems from the original Paraiba localities in Brazil, and many people want to buy only gems that have natural, untreated color. Determining this information is above the skill level of and equipment available to most gemologists.

A reputable place to have this done is The Gemological Institute of America (GIA) laboratory. They offer Colored Stone Identification and Origin Reports specifically for Paraiba tourmaline. By sending your gem to GIA for one of these reports, they will provide their opinion on the geographic origin of the gem, and provide information about any treatments that have been detected.

There is nothing wrong with African tourmalines with the spectacular "neon" and "electric" colors. They can command a high price on the basis of color alone. However, some people disagree with using the name "Paraiba" for these gems. They believe that using a geographic name for marketing a gem, if the gem is not from the named locality, can be confusing at best and deceptive at worst.

The Upside of Paraiba

Paraiba tourmaline has captured an enormous amount of attention in the gem and jewelry market. That attention has made tourmaline a much more widely known gem.

Color Zoning in Tourmaline

Changing conditions during tourmaline crystal growth often result in single crystals that contain two or more different colors of tourmaline. The earlier color is usually overgrown by the later color. These bicolor crystals are known as "zoned crystals." Cut gemstones with distinctly different color zones are known as parti-color gems.

In many gems, color zoning is undesirable because most gem and jewelry buyers prefer stones that have a single, uniform face-up color. Tourmaline is an exception to this trend. Gems cut from color-zoned crystals with pleasing colors are a novelty prized by designers and collectors.

Color-zoned crystals are often sawn into thin cross-sections and polished. These thin bicolor gems can be very attractive. The most popular bicolor tourmaline is "watermelon tourmaline." It has a pink interior and a green rind - just like a slice of watermelon. The closer the colors match those of a real watermelon, the more people enjoy them and the higher the price.

Tourmaline crystals are also faceted to produce bicolor gems. "Watermelon" is again the most popular, but many other beautiful color combinations are cut.

Zoned tourmaline crystals often have clarity problems in the color-change area. If the color combination is attractive, minor clarity problems usually do not have a major impact on their desirability or price.

Cat's-Eye Tourmaline

Tourmaline is one of many minerals that can be chatoyant when cut into a gem. "Chatoyant" is a gemological adjective used to describe minerals that exhibit a "cat's-eye". Chatoyant tourmalines contain thousands of tiny parallel tubes that have the ability to reflect light. When a tourmaline crystal filled with these tubes is properly cut into a cabochon, a line of bright light known as a cat's-eye will be reflected from the dome of the cabochon. The proper orientation is obtained by cutting the cabochon with the tubes paralleling the base of the cabochon and crossing the long dimension of the cabochon at a right angle.

Cat's-eye gems are fun to observe because the "eye" will move back and forth across the dome of the stone in three situations: 1) when the stone is moved under the light, 2) when the source of light is moved, and 3) when the head of the observer is moved.

Please see our article about Chatoyant Gems.

Pleochroism in Tourmaline

Tourmaline is a pleochroic mineral. That means its apparent color can change with different directions of observation. The color is usually darkest looking down the c-axis of the crystal (down the long axis). It is usually lightest when viewing perpendicular to the long axis of the crystal.

Cutting pleochroic gem materials requires skill and knowledge. Rough must be studied and oriented to produce a gem with pleasing face-up color. A light piece of rough can be cut with the table of a stone perpendicular to the c-axis of the rough to maximize color. Dark rough can produce lighter gems if it is cut with the table plane of the stone parallel to the c-axis of the rough. Some rough can be cut to nicely display two pleochroic colors in the face-up position. Many jewelry buyers enjoy these gems.

Color optimization of pleochroic rough is time-consuming, requires special skills, and usually involves sacrifice. Which will produce a higher profit? A stone of premium color with a lower carat weight, or a larger stone with a less desirable color? These are the economics of faceting tourmaline.

Tourmaline Treatments

Heat and irradiation are common treatments used to improve the color of tourmaline. Both of these treatments are commonly done after the stones have been cut and polished. They can be undetectable when viewed with a gemological microscope.

Heat treatment can lighten an undesirable tone in some materials and give some brownish stones a brighter, more desirable color. The results of heat treatment are usually permanent. Stones with liquid inclusions are not good candidates for heat treatment because heating can cause them to fracture.

Irradiation treatment can brighten many light-colored stones. The results are often reversed if the stones are heated. They can also be reversed over time with exposure to bright light.

Imitation Tourmaline

Imitation tourmaline is occasionally seen. The popular watermelon tourmaline and other parti-colored tourmalines are a common target of the imitators. Some assembled imitation stones consist of a thin wafer of colored glass or plastic, glued between two pieces of colorless glass.

These imitations are easy to detect with a microscope or loupe. If the stones are examined along the girdle, the edge of the colored wafer or the glue line can usually be seen. If the stones are examined by looking down through the table, bubbles or debris in the glue plane are sometimes visible.

Dixie Mineral Council Field Trip

An Official Field Trip of the Mississippi Gem and Mineral Society (Florence, MS)
An Official Field Trip of the Forsyth Gem and Mineral Club

Note: DMC Field Trips are for club members of DMC-affiliated clubs and their families only. Liability issues mean that these trips cannot be attended by the general public unless otherwise noted.

Hammett Gravel Pit

Redwood, Mississippi

LIMITED to 80 Attendees
Registration Required

NOTE: DMC field trips will continue to be planned and scheduled but may be cancelled or rescheduled pending COVID-19 status. If there any changes to a trip, all contacts listed for DMC member clubs will be notified via email as soon as possible. The DMC trip schedule page on the SFMS website (http://www.amfed.org/sfms/_dmc/dixie-proposed-ft.htm) will also be updated with the current status of trips. **Lori Carter, DMC Coordinator**

TRIP: This site is an active gravel pit producing sand and gravel for industries and has igneous, metamorphic and sedimentary rocks. Citronella gravel is mined from a layer 40 feet below Ice Age loess soil.

COLLECTING: Expect to find agates, coral and other fossils, geodes, chunks of petrified wood, and Sioux quartzite as we hunt around and on piles of gravel.

BRING: Bring a bucket, bag, or backpack for collecting as you climb on the gravel piles. A spray water bottle is helpful to clean off the red sand and dirt. Wear close-toed shoes to protect feet. If you need ankle support, wear hiking boots. Bring gloves, hat, sunglasses, bug spray, sunscreen, and a chair. If you have allergies or require medication, please bring your medication. Expect heat and humidity. Wear lightweight, loose fitting clothing and a light-colored, wide-brimmed hat if possible. Bring snacks and plenty of water, sports drinks, and/or non-alcoholic beverages. Pack a lunch if you expect to stay until the 2 p.m. departure time.

SITE REQUIREMENTS: Participates must stay off equipment, out of ponds, and away from loess walls.

SPECIAL CONDITIONS: This is a remote area and there will be little or no cell phone reception. We will not park close to the hunt piles. Unless you are very selective, you will make multiple trips to your auto to deposit your finds to avoid potential injury. Footing on the gravel piles can be tricky. People who have stability issues should stay at the bottom of the gravel piles. It will still be good hunting. Walking and digging on steep slopes can lead to slides; be aware that gravel slides are possible. Stay away from the edge of rock piles against the ponds.

EXPECT HIGH TEMPERATURES AND HUMIDITY. High humidity can make it more uncomfortable and increase the chance of heat exhaustion and heat stroke. It will be important to drink plenty of fluids. Don't wait until you feel thirsty to drink. Take water breaks every 20 minutes. There will be no shade in the gravel pit except man-made shade.

REGISTRATION: Limited to 80 participants. Email registration preferred; see contact information below. If the attendee limit is reached, a waiting list will be established. Should plans change after registration confirmation is received, please cancel so another person can attend.

CHILDREN: Children are allowed if a club member. Adult supervision is required at all times. Children may not throw rocks or run at the site, especially on the gravel piles. Care should be taken when around the ponds. No climbing on equipment is allowed.

PETS: No pets allowed.

FACILITIES: No stores or facilities are close to the collecting site. A portable toilet will be on the site. At the meeting place, there will be drinks, snacks, some prepared breakfast/lunch food items, and restrooms.

ADDITIONAL INFORMATION: The meeting place is between Vicksburg and Jackson, Mississippi. Vicksburg is a historical area with casinos, hotels, and restaurants (I-20 Exits 1 to 5). If you would prefer to stay in the Jackson area, there are a variety of hotels and restaurants available at I-20 Exit 48 (Pearl) or I-20 Exit 36 (Clinton). Clinton will be the closest to meeting place.

DIRECTIONS AND WHERE TO MEET: Meeting location and directions will be provided after registration to those on the attendee list.

Meeting Minutes

The March meeting was cancelled due to the Covid-19 situation, so there are no minutes for the month.

.Respectfully Submitted,
Lisa Reed, Secretary

Nature's Treasures

Nature's Treasures is the monthly newsletter of the Forsyth Gem and Mineral Club.

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