

# FORSYTH GEM AND MINERAL CLUB, INC.

## *Nature's Treasures*

July 16, 2020

\*\*\* **Public Version** \*\*\*



**MEETING:** Due to the ongoing Covid-19 (Coronavirus) situation and lockdown, FGMC will be attempting an online/Zoom meeting this month. Shaun Shelton will be hosting the meeting on his personal Zoom site:

Join Zoom Meeting

<https://zoom.us/j/6126926860?pwd=Q3RwMDhwV2FCVVNVNVHhPQUQwNDQ1dz09>

Meeting ID: 612 692 6860

Password: 1dw6Tg

**Meeting will be on Wednesday, July 15, starting at 7:00 PM.** The meeting topic will be "Minerals of Hiddenite".

If this experiment proves successful then there may be similar meetings in the future, until we have a chance to get together again physically.



## **2020 Gem Show, Picnic, and Auction Cancelled**

From Arvil, regarding the show and picnic:

After much deliberation and evaluation of the current environment regarding the COVID- 19 epidemic along with the uncertainty of the environment in September, it has been determined to cancel the 2020 Forsyth Gem and Mineral Club Show. This is following the lead of several other major organizations/events which have decided to cancel activities during the same timeframe as our show. Correspondingly, the club picnic is canceled.

As show chairman, I extend my thanks and gratitude to those members that volunteered to work during the 2020 event.

I truly hope that all members remain safe and well during this epidemic and that we are able to deliver our best show ever in 2021 in recognition of our clubs golden 50th anniversary show.

W. A. Marion  
Show Chairman  
Forsyth Gem and Mineral Club

And from Jeff regarding the auction:

Hope this note finds you safe and avoiding all of this virus mess!

Just a quick note to ask that you place a short notice in the next club newsletter indicating that the decision has been made to cancel the 2020 Club Auction (which was planned for August 22nd). It simply didn't seem prudent to bring on the risk due to virus concerns. I do plan to restart it in 2021 though!

Thanks,  
Jeff



## Reviewing: Silver

From [Geology.com/minerals](http://Geology.com/minerals)

The soft, white, native metallic element with a diversity of uses.

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

### What is Silver?

Silver is a soft, white metal that usually occurs in nature in one of four forms: 1) as a native element; 2) as a primary constituent in silver minerals; 3) as a natural alloy with other metals; and, 4) as a trace to minor constituent in the ores of other metals. Most of the silver produced today is a product of the fourth type of occurrence.

Silver is known as a "precious metal" because it is rare and because it has a high economic value. It is valuable because it has a number of physical properties that make it the best possible metal for many different uses.

Silver has an electrical and thermal conductance that is higher than any other metal. It has a higher reflectivity at most temperatures than any other metal. It has an attractive color and luster that resist tarnish and make the metal desirable in jewelry, coins, tableware, and many other objects.

These are just a few of silver's important properties. When performance is more important than price, silver is often the material of choice.

### Physical Properties of Silver

Chemical Classification	Native element
Color	Silvery white
Streak	Silvery white
Luster	Metallic
Diaphaneity	Opaque
Cleavage	None
Mohs Hardness	2.5 to 3
Specific Gravity	10.0 to 11.0
Diagnostic Properties	Color, specific gravity
Chemical Composition	Ag
Crystal System	Isometric
Uses	Jewelry, tableware, coins, electronics, photographic films, ornaments

### Silver as a Native Element Mineral

Silver is rarely found as a native element mineral. When found, it is often associated with quartz, gold, copper, sulfides of other metals, arsenides of other metals, and other silver minerals. Unlike gold, it is rarely found in significant amounts in placer deposits.

Native silver is sometimes found in the oxidized zones above the ores of other metals. It persists there because silver does not readily react with oxygen or water. It does react with hydrogen sulfide to produce a tarnished surface that is composed of the silver sulfide mineral known as acanthite. Many specimens of native silver that have been exposed to the atmosphere or to hydrothermal activity have an acanthite coating.

Most native silver is found associated with hydrothermal activity. In these areas it often occurs in abundance as vein and cavity fillings. A few of these deposits are large enough and rich enough in native silver to support mining. In most cases, the economic viability of the deposit depends upon the presence of other valuable minerals. The mines are usually underground operations that follow the veins and cavities where the native silver occurs.

Native silver is usually without a characteristic crystal habit. When it forms in the open spaces of pockets and fractures, some interesting crystal habits sometimes develop. The crystals are rarely the cubes, octahedrons, and dodecahedrons expected of an isometric mineral. Instead the silver's habit is usually thin flakes, plates, and dendritic crystal clusters formed in the narrow spaces of joints and fractures. Filiform and wire-like habits are also seen.

## Minerals that Contain Silver

Acanthite	Ag <sub>2</sub> S
Aguilarite	Ag <sub>4</sub> SeS
Allargentum	Ag <sub>1-x</sub> Sbx
Andorite	PbAgSb <sub>3</sub> S <sub>6</sub>
Arcubisite	Ag <sub>6</sub> CuBiS <sub>4</sub>
Argentite	Ag <sub>2</sub> S (when above 177°C)
Argyrodite	Ag <sub>8</sub> GeS <sub>6</sub>
Arquerite	(Ag,Hg)
Berryite	Pb <sub>3</sub> (Ag,Cu) <sub>5</sub> Bi <sub>7</sub> Si <sub>6</sub>
Boleite	KPb <sub>26</sub> Ag <sub>9</sub> Cu <sub>24</sub> (OH) <sub>48</sub> Cl <sub>62</sub>
Bromargyrite	AgBr
Canfieldite	Ag <sub>8</sub> SnS <sub>6</sub>
Chlorargyrite	AgCl
Chrisstanleyite	Ag <sub>2</sub> Pd <sub>3</sub> Se <sub>4</sub>
Crookesite	Cu <sub>7</sub> (Tl,Ag)Se <sub>4</sub>
Dyscrasite	Ag <sub>3</sub> Sb
Empressite	AgTe
Fettelite	Ag <sub>16</sub> HgAs <sub>4</sub> S <sub>15</sub>
Freibergite	(Ag,Cu,Fe) <sub>12</sub> (Sb,As)4S <sub>13</sub>
Freieslebenite	AgPbSbS <sub>3</sub>
Gabrielite	Tl <sub>6</sub> Ag <sub>3</sub> Cu <sub>6</sub> (As,Sb)9S <sub>21</sub>
Hessite	Ag <sub>2</sub> Te
Iodargyrite	AgI
Jalpaite	Ag <sub>3</sub> CuS <sub>2</sub>
Krennerite	(Au <sub>0.8</sub> ,Ag <sub>0.2</sub> )Te <sub>2</sub>
Marrite	PbAgAsS <sub>3</sub>
Miargyrite	AgSbS <sub>2</sub>
Moschellandsbergite	Ag <sub>2</sub> Hg <sub>3</sub>
Pearceite	Cu(Ag,Cu) <sub>6</sub> Ag <sub>9</sub> As <sub>2</sub> S <sub>11</sub>
Petzite	Ag <sub>3</sub> AuTe <sub>2</sub>
Polybasite	[(Ag,Cu) <sub>6</sub> (Sb,As) <sub>2</sub> S <sub>7</sub> ][Ag <sub>9</sub> CuS <sub>4</sub> ]
Proustite	Ag <sub>3</sub> AsS <sub>3</sub>
Pyrargyrite	Ag <sub>3</sub> SbS <sub>3</sub>
Samsonite	Ag <sub>4</sub> MnSb <sub>2</sub> S <sub>6</sub>
Stephanite	Ag <sub>5</sub> SbS <sub>4</sub>
Stromeyerite	AgCuS
Stützite	Ag <sub>5-x</sub> Te <sub>3</sub> (with x = 0.24 to 0.36) or Ag <sub>7</sub> Te <sub>4</sub> -
Sylvanite	(Ag,Au)Te <sub>2</sub>
Uytenbogaardtite	Ag <sub>3</sub> AuS <sub>2</sub>

The number of minerals that contain silver as an essential constituent is surprising. The green table on this page contains a partial list of silver minerals that includes 39 different species. Each of these is a distinct silver mineral. All of them are rare, but a few (such as acanthite, proustite, and pyrargyrite) can be found in sufficient quantities to warrant mining. Silver minerals can be sulfides, tellurides, halides, sulfates, sulfosalts, silicates, borates, chlorates, iodates, bromates, carbonates, nitrates, oxides, and hydroxides.

## Natural Silver Alloys and Amalgams

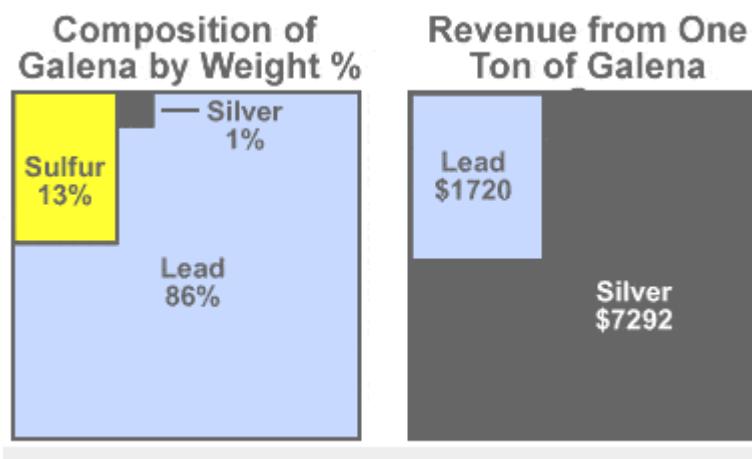
Most gold found in placer deposits is alloyed with small amounts of silver. If the ratio between gold and silver reaches at least 20% silver, the material is called "electrum." Electrum is the name for an alloy of gold and silver. A significant amount of today's silver production is a refining byproduct of gold mining.

Silver also forms a natural alloy with mercury. This silver amalgam is sometimes found in the oxidation zones of silver deposits and is occasionally associated with cinnabar.

## Silver as a Constituent in Other Metals and Ores

Most of the silver produced today is a byproduct of mining copper, lead, and zinc. The silver occurs within the ores of these metals in one of two ways: 1) substituting for one of the metal ions within the ore mineral's atomic structure; or, 2) occurring as an inclusion of native silver or a silver mineral within the ore mineral. The value of this minor silver within the ore mineral can exceed the value of the primary metal within the ore.

The diagram below considers the situation of argentiferous galena (galena that contains up to a few percent by weight of silver substituting for lead in the galena mineral structure).



Galena value: Some mines producing galena produce more revenue from the silver content of their ore than from the lead content. Assume that we have a mine that produces argentiferous galena with an average composition of 86% lead, 13% sulfur, and just 1% silver (as shown in the diagram on the left).

If the silver price is \$25 per troy ounce and the lead price is \$1 per avoirdupois pound, the value of the lead in one ton of ore will be \$1720, while the value of the silver in that same ton of ore will be \$7292 (as shown in the diagram on the right).

The small amount of silver has a huge impact on revenue because at the prices assumed, silver is 364 times more valuable than an equal weight of lead. It is easy to understand why mining companies get excited by argentiferous galena! Even though galena is the ore being removed and lead makes up the bulk of the product, these mines are often called "silver mines."

### Geographic Distribution of Silver Production - 2013 Silver Production

Country	Metric Tons
Mexico	5,360
China	3,900
Peru	3,480
Australia	1,730
Russia	1,500
Bolivia	1,210
Chile	1,190
Poland	1,150
United States	1,060
Canada	663
Other Countries	4,230

The values above are estimated silver mine production in metric tons from USGS Mineral Commodity Summaries.

Silver and silver-bearing minerals tend to be closely associated with magmatic activity, as that is where hydrothermal activity also occurs.

This association holds especially well along western North, Central, and South America, where silver production follows the trend of the Andes Mountain Range. Argentina, Bolivia, Canada, Guatemala, Honduras, Mexico, Peru, and the United States are all significant producers of silver today and in the past. In other parts of the world, silver production is associated with igneous activity of any geologic age.

In Europe there is a band of current and geologically ancient volcanic activity that passes from Spain in the west into Turkey in the east. Much of the European silver production has been from this trend.



## Meeting Minutes

The June 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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