

The Promiscuous Garnets



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Figure #1- "Hyacinth" Garnet, (an archaic term used to describe a pyrope-almandine type Garnet), mounted with small rubies, in the "Eagle of Poland",

made in Germany. The jewel was part of the collection of the Royal Crown Jewels of Louis XIV, now housed in the Louvre in Paris.



Figure #3 – The new “Mint” Garnet, this stone, weighing over 4 carats, very closely resembles a green diamond!

It is always a pleasure to be included in Antiquorum’s VOX and to take a few pages to devote to my passion – gems and jewelry. On this occasion, I would like to hopefully enlighten some of you about the exceptionally beautiful, and often highly underrated, species of GARNETS! When the average person thinks about garnets, a cheap, dark red stone usually comes to mind, often associated with rather common Victorian jewelry, and sadly associated with mourning jewelry. But alas, there is a whole other world of these gemstones, including bright orange and vivid green garnets that are of significant value and are magnificent both in jewelry and for the collector.

In past articles I have always tried to stress the importance of the mineral species and that gemstones belonging to the same species are basically the same, the different varieties often owing their differences, such as color, to trace impurities, (such as ruby and

sapphire which are both varieties of the species of corundum) and that a mineral species consists of various gems sharing the same chemical composition, with similar physical and optical properties. However, many years ago when I was a young gemologist, my father, Antonio Bonanno, who was a great founding-father of the science, left an impression on me when he described the garnets as that “promiscuous group” (!) – and that is exactly so! As Robert Webster, the renowned contemporary of my father put it: “Garnet is the name for a group of minerals all of which have a common crystal habit and some similarity of chemical composition.” They frequently interchange elements, substitute traces of this for that, so that it is often hard to look at a garnet and know, for sure, to which variety it belongs. Chromium gives red and green color to many of the garnets, as well as vanadium, and then there is magnesium, manganese, and on and on, with iron in practically all of the species.



Figure #2 – An extremely rare and huge Tavorite Garnet, weighing 14.34 carats, which has been certificated “flawless”!



Figure #4 - Exceptionally Fine Spessartite Garnet, weighing over 20 carats, from Namibia

Let it suffice to know that there are basically 6 members: almandine, pyrope, grossular, and, spessartite, andradite, and uvarovite. The first three are promiscuous amongst themselves, as well as the group of the second three, but then, there can be mixtures amongst them all, so I would be less concerned about the exact variety of garnet than with other gem species. And then of course, there are varieties, or sub-varieties amongst the different groups, all with slight variations on their chemical and physical properties! Basically, the refractive indices for most garnets cannot be read on a standard refractometer since many of the readings are too high, but they vary so much, that many such as pyrope, can be read, varying from approx. 1.73 to 1.75, while almandine's is over 1.78, and andradite is over 1.88. The specific gravity also varies from approx. 3.60 to over 4.20. The one constant that I have found quite helpful in distinguishing garnets from other similarly looking gemstones (like red spinel), is the fact that they do not exhibit any fluorescence under long or short wave radiation; the iron which is present in garnets kills any fluorescence, although I imagine it is only a question of time before that "rule" has an exception too.

However, despite some of the complications for the gemologist, garnets have many wonderful attributes!! First and foremost for me, is the fact that they have a very high luster - most are sub-adamantine, which refers to the surface brilliancy (which is also influenced by hardness and polish); the sub-adamantine luster of many of the species is second only to diamond! This brings me to another attribute, and that

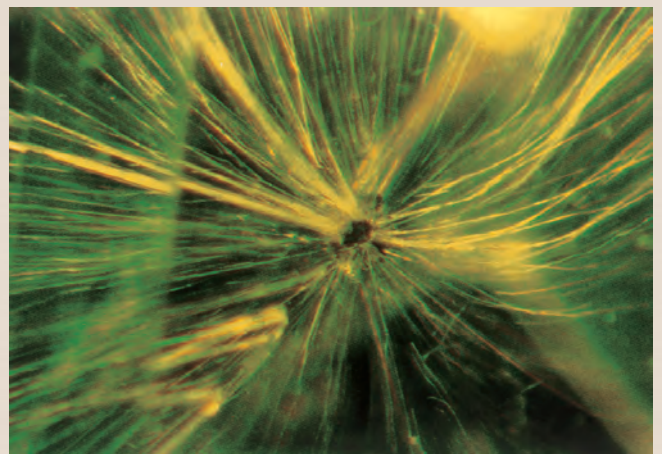


Figure #6 - A close-up of the "horse-tail" fibrous inclusions found in Demantoids



**Figure #5 – Antique Russian pendant, circa 1880,
set with Demantoid Garnets and diamonds**

is that garnets are pretty hard, averaging from 6.5 to 7.5 on the Mohs scale which makes them quite wearable! They belong to the cubic crystal system, but do not have cleavage planes, so they are not fragile, and take well to cutting and a good polish. They are almost always “natural”, in that only a very small percentage of garnets are treated or enhanced, which is extremely rare in the gemstone market today. So let me introduce to those of you that are unfamiliar with the beauty of garnet a few examples of this great gemstone.

Garnets can be found in almost every color of the rainbow, except blue!!! The most common color, and commonly occurring garnets are the reds – the pure pyrope red, and the almandine, with mixtures between the two creating the blood red, to brownish-reds to violet-reds and everything in between. Those are the ones so commonly seen as rose cuts, in antique Victorian jewelry. These garnets are also called the Bohemian garnets, and have historically come from the Bohemian Hills of Czechoslovakia, since the 1500s!! (See Figure #1) Although this type of garnet has been found in the treasures of Ancient

Egypt as well, and has a history which well precedes the 1500s!

The grossular group produces some opaque pale green and red material that is good for carving and ornamental use. Hessonite garnets are of the grossular group, but are transparent and found in brownish-yellow to brownish-orange, to red! However, in the 1960s, a new find of brilliant green grossular garnets were found in Africa, in the Tsavo National Park in Kenya. This variety is called tsavorite, named after the park (the “t” is not pronounced.), and is found in a rich, deep green hue! It usually occurs in small sizes, under 3 carats*, and has been confused with fine emerald, although because of its high luster, it is livelier than emerald!! Large tsavorites, from 2 to 3 carats*, can cost well above \$1,200 –\$1,500 per carat, while “huge” stones can cost several thousands of dollars per carat (See figure #2)! They are also found in Tanzania, and have recently been found in Pakistan. A brand new green grossular garnet has just been discovered in the Meralani Hills, in Tanzania (the same area where Tanzanite is found), and has been called “Mint” garnet, after its fresh, minty green body color!! (See Figure #3) The price has yet to be



**Figure #7 – An extremely rare Color-Change Garnet from Madagascar
(Photo by Tino Hammid)**

established, but I bought a lovely specimen for several hundred dollars per carat!

Then we have the spessartites which also produce some brownish-reds, and some lovely yellows and oranges! Many of these rare oranges were found in small sizes, with undertones of brown, and were found primarily in Africa, some in California, recently in Brazil, and Pakistan and Afghanistan. However, recent discoveries have blown all the other orange spessartites out of the water!!! In 1995, a find of a brilliant, strong, pure pumpkin orange spessartite was discovered in Nigeria, and more recently, the Namibian orange spessartite has become king of this variety (See Figure #4). There is no natural, transparent gemstone in existence that exhibits such a strong, pure orange color, and when cut and polished, with its high luster, it is a gemstone which strikes awe in anyone who sees it. (The Winston Pumpkin Diamond is similar in color!) If the common red garnets cost from \$5 to \$50 per carat, the orange spessartites, depending on their country of origin or strength of color, costs up to several hundred dollars per carat, for sizes from 2 to 6 carats*, while those over 10 carats* can cost well above a thousand dollars per carat and more if there is very good clarity, or lack of internal inclusions (which is even rarer in big sizes).

Another interesting member of the garnet species is the andradite garnet. In the jewelry world, it is known for its two extremely different varieties! The black variety is extremely common and goes by the name melanite, and was used often in Victorian mourning jewelry. However, the other variety is the most precious and sought-after of all the garnets, and that is the demantoid garnet, which is a beautiful bright green color. It was first found in the Ural Mountains, in Russia, in 1868, and many fine antique jewels made in the latter 1800s and early 1900s can be found today accented with demantoid garnets (See Figure #5). All royalty prized them, and Karl Faberge made use of their beauty to adorn many of the imperial court jewels of the Russian Czars and Czarinas. They do not occur in large sizes, a 4 to 5 carat* demantoid is considered huge, so that jewels are decorated with many small stones. They are exceptionally lively though, and command attention; their dispersion, or “fire”, is higher than that of diamond, but they are relatively soft compared to other garnets, having a hardness of 6.5 on the Mohs scale only. They owe their color to traces of chromic oxide, and exhibit a yellowish green. Their identifying, telltale inclusion is the “horse-tail” inclusion, which is diagnostic for the demantoids. (It was always thought that this inclusion was formed by byssolite

(See Figure #6), [tremolite-actinolite-amphibole], but with today's high technology, it seems that it is probably consisting of chrysotile-serpentine, or is this just another example of the species promiscuity!?). Demantoids are also found on either side of the Urals, in Europe and in Asia, in the Congo, and there has been a recent find of a more bottle green color in Val Malenco, in Northern Italy. Russian demantoids are still the most highly sought after, and fine examples still command the highest prices of all the garnets – over \$5,000 per carat for large, fine gems! There are other variations of andradite, but none really worth mentioning for the gem collector.

The last of the major garnet groups is uvarovite, but this is not usually found in jewelry. It is a rich, dark green to black garnet, but its crystals are so small that they cannot be individually cut. Occasionally, specimens of drusy layers may be found mounted in jewelry, but this is the exception.

In terms of exceptions, there are, as I mentioned in the beginning of this article, many mixtures of all the garnets, so there is not a straightforward listing of the variations of the species. I also mentioned that garnets can be found in all the colors of the rainbow, with the exception of blue, but that is not entirely true either!! I remember seeing a color-change garnet in my father's laboratory, in 1980 I believe, which had a reddish-color that changed to blue!!! Now they are not unheard of as they were 25 years ago, and while I do not know from which country the specimen came from in 1980, I had heard of them coming from Tanzania, then Sri Lanka, and finally, there was an important discovery of these rare garnets in Madagascar just a few years ago. (See Figure #7) A dealer sold a very large stone, weighing over 6 carats, several years ago for \$9,000 per carat, or \$54,000 for the stone! Most do not exceed 1 carat, and the price per carat is much lower, but I understand that 2-3 carat sizes fetch a couple of thousand dollars per carat, or more. While color-change garnets are much rarer than alexandrites, both changing from a green or bluish-green in daylight to red or violet red in incandescent light, these garnets are so rare and

unheard of that there is basically no market yet for them, hence, their prices are still much lower than fine alexandrites, but the color-change garnets rival the best of the Brazilian alexandrites, which exhibit fantastic color change! Madagascar also produces a mixture of pyrope-spessartine garnets which exhibit a pink to pinkish-orange body color. For those of you that enjoy “phenomenal” gemstones, star garnets exist as well!! Most of the star garnets exhibit a 4-rayed star, but some exhibit a 4-rayed and a 6-rayed star, all in the same stone, depending on the angle of viewing!! Most of these are of the almandine group (rhodolite, specifically), and when properly cut into cabochon form, if there are enough rutile crystals, a star can be observed, and sometimes even a cat's eye, or chatoyancy! These are usually from Africa – Tanzania, Zimbabwe, Madagascar, or from North Carolina in the USA, or Sri Lanka, or India.

Garnets are not all rare gemstones, and I have enjoyed collecting beautiful crystals right in my backyard, in Connecticut and New York, including Central Park (!) although these are the “common”, rather boring varieties! However, the species is so varied, with so many beautiful colors to choose from, that when you add the few extremely rare varieties, such as the oranges and greens, you have a gem that rivals the best of the classic gemstones. If you add the fact that: most garnets have not been enhanced or treated artificially; most exhibit a superb luster and vividness; they are not fragile; most are lightly included compared to many other important gem species; and they are particularly lower in price than other comparatively beautiful gemstones - than I think you will agree with me that this is a gem species that is highly underrated!! I love the garnets, and hope that you will keep an eye open for the beautiful green tsavorite, mints, and demantoids, and the brilliant, fiery orange spessartites, and the especially rare color-change, alexandrite type garnets, as well as perhaps having a more appreciative regard for the reds, pinks and purples!! All in all, I think that promiscuity amongst the garnets is a good thing!!

** - Refers to gemstones that are cut and polished, not rough weight*