The Red Emerald

Black Album

Words by Seth William Rozendaal

Photos by David Rozendaal

This work is for the enjoyment of gemstone aficionados around the world and throughout time,
and dedicated to the divine muse who inspires everything.

This book celebrates the Red Emerald's public debut at the 2017 Tucson Gem and Mineral Show.

More Red Emerald crystal forms and mineral habits are documented in this historic archive
than the combined number of all pictures ever published of this variety before.

Graphics taken from the *Mineralogical Record Volume 47 Number 1: Colombian Emeralds* where noted.
The two photos of the Heart matrix specimen on the top of the page in **Section VI** were taken by Wayne Schrimp.
Seth Rozendaal is responsible for the landscape photo in **Section II,** the beveled heart in **Section VI** and Office Suite Graphics.
The Suite Treasure necklace photo in **Section XIII** was taken at the Brent Isenberger Studio.

Cover and all interior photos in this album were taken by David Rozendaal.
Without his tireless dedication, this publication would not have been possible.

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I ~ Red Beryl IS Red Emerald

The human infatuation with Emeralds runs so deep, and our desire for them traces so far back…
It's one of the only gemstones found in rank-signifying Neolithic headdresses. Yeah, you heard me:
***Caveman Crowns**.*

Aja Raden - Author, Historian and Scientist

Diamonds may be forever, but only Emeralds are eternal; our appreciation of Emeralds stretches from the beginning of human civilization to the very end. Cultures on all continents have treasured Emeralds since prehistory, revered as symbols of spiritual beliefs or admired as physical reminders of past events in an era before writing. Emeralds are referenced in the oldest written human communication ever discovered, including one of the first examples in the use of parchment, the *Prisse Papyrus*, and cuneiform cylinders from Babylonian markets dated to 5000 BC. The significance of a new variety in this species cannot be overstated.

The etymology of the word ***Emerald*** comes from the Greek ***Smaragdos***. While contemporary definitions usually describe ***Smaragdos*** as ***Green Stone***, Easton's Bible Dictionary from 1893 identifies the true meaning of ***Smaragdos*** in Biblical Greek to be ***Live Coal***. In historical descriptions from the Bible to Pliny the Elder, Emeralds are identified not by their color, but by the quality of their light.

A high refractive index makes Diamonds the sopranos of the gemstone choir, but Emeralds are the bass. A high index creates a more brilliant stone, while the low refractive index of beryl filters the intensity of light to create the pleasing, slow-moving effect distinct to this species. Of all beryl varieties, only the red and the green have been given the exceedingly rare Type III designation under the Gemological Institute of America's Clarity Classification System. Type III stones are expected to contain inclusions, fissures, pits or other characteristics considered "flaws" in more common species. The dispersive effect these inclusions have on light purified by a low refractive index generates the glow which has captivated humanity's attention and admiration since the dawn of time. As the lone Type III beryls, red and green are the sole family members who produce the diffused brilliance requisite for Emerald classification.

Only gem-quality beryl can be called an Emerald. If poor quality material is so heavily-included no light transmission occurs, the rough will merely be called green beryl. Maynard Bixby discovered red beryl in 1904; no facet-grade crystals were located until 1958, making that year the first in which Red Emeralds could be seen or known to mankind.

I ~ Red Beryl IS Red Emerald

The Red Emerald possesses all the character traits that distinguish Emerald from beryl.		
ATTRIBUTE	BERYL	EMERALD
Method of Growth	Mostly Pegmatitic	Mostly Volcanic
Geological Incidence	Frequent	Rare
Average Crystal Size	Commonly Large	Commonly Small
GIA Clarity Classification	Type I	Type III
Enhancement Type	Permanent - Heat	Reversible - Liquid
Saturation Level	Low	Intense
Market Value	Low to Moderate	High to Extreme

Like fingerprints, an Emerald is unique; every one can be distinguished from all others. Natural features inside make each stone what it is: an actual acquaintance one may come to recognize. The Emerald cut is designed for the connoisseur's fascination, prominently displaying these aspects in the *jardin*, or *garden*. There, entire worlds and fascinating universes are housed within these jewels, frozen in eternal fire. As the legendary dealer Alfonso Acuña recommended, "If you look into enough Emeralds, you will begin to dream about the inner landscapes you see there. I promise you that."

The 3.31 carat ***Sunset Emerald*** is a fantastic scene
to begin investigation into the depths of these wondrous, crimson flames…

II ~ Formation

Uncommonly photographed scene FROM the Ruby Violet claims, looking out through a burgundy lens-flare rainbow.

The rarest precious gemstone deposits on Earth formed 23 to 18 million years ago, during *large-scale regional crustal extension and thinning…[which caused] rhyolitic magmas [to] rise to the upper levels of the crust, where they are emplaced as shallow, subsurface domes* (***Gem Quality Red Beryl from the Wah-Wah Mountains, Utah***, Shigley & Foord - *Gems & Gemology*, Winter 1984). Basically, a giant bubble of lava came to rest beneath the surface of the earth, cooling slowly from 1470 to 870 degrees Celsius. This temperature range allowed hexagonal molecules of beryllium to affix on bixbyite nucleation points drifting in the volcanic solution. Upon the foundation of these seed crystals, six-sided molecular plates could coalesce, "stacking" into hexagon wafers and prisms.

Only the green and the red members of the beryl family are produced as the direct result of volcanic activity. Red Beryl crystallization occurs as cooling lava, or magma, gradually solidifies into igneous rock. As the root word IGNITE suggests, igneous rocks are ideal conditions to birth the red fire owned by our American Emeralds. "Nature wasn't kind to those crystals when they were formed," Colorado gem cutter Mark Krivanek said. "They had to work hard to grow in an incredibly harsh environment." This is the rationale for the Type III classification Emeralds possess in the Gemological Institute of America's Clarity Classification System. The result of destructive growing conditions is that every natural stone possesses inclusions, fissures and other imperfections which demand appreciation for the victory over impossible hardship they represent, and the exquisite beauty they confer unto the crystal and the observer.

Fractures present in Red Beryl often show signs of healing, suggesting another infusion of molten material may have entered the bubble, reheating the mix, thus creating a secondary growth period. All cooling must have occurred WITHOUT any faults or fractures accessing the outside environment…such an autonomous atmosphere would account for why the Red Beryl is waterless.

In beryl, beryllium atoms gather six oxygen each to form a molecule, locking them together in a meta-stable hexagonal ring structure known as the cyclosilicate. This type of formation enjoys a permanence which is aged on a time scale far beyond the human existence. If a molecule of water is located within this ring before it closes, that H_20 will be trapped inside for all of our perceptible eternity. Only a single molecule may fit in each ring, but *every one of the 62 naturally occurring beryls [show] pronounced water absorptions, as do all published natural beryl spectra; analyses usually indicate 0.3 to 3 percent H_2O…[but] it is possible to place an upper limit of 0.002 percent on the water present in our [Red Beryl] sample* (***An Examination of Red Beryl from Utah***, Wood & Nassau - *The American Mineralogist*, 1968). One hundredth to one thousandth the imprisoned level of such a common molecule suggests Red Beryl's fascinatingly unique growing environment must have been hermetically sealed from the outside world.

Now, the ***Red Emerald*** is finally ***free***.

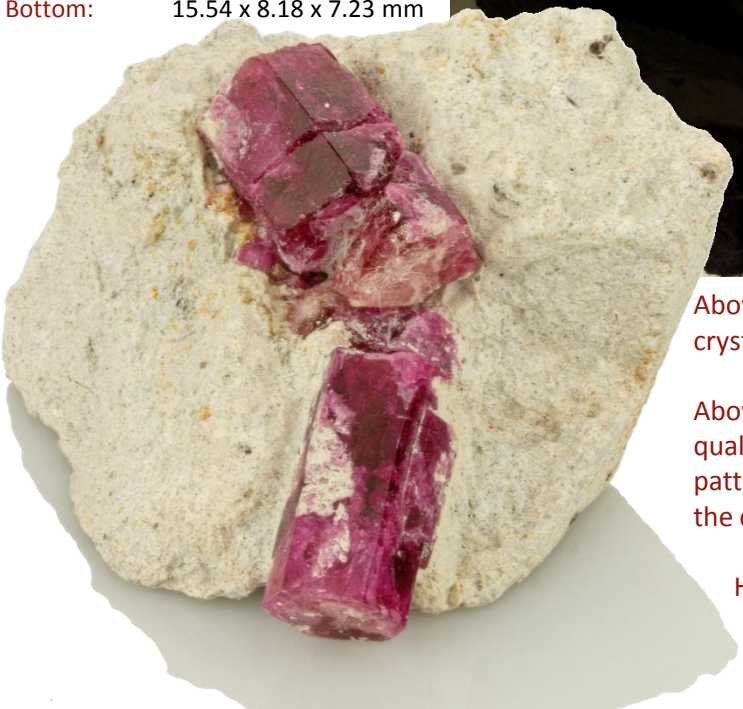
III ~ Matrix Specimens

Fractures along red beryl zones are often filled with 'Ice Cream', a miner's term for fine rhyolite silt powder which settled into cracks over millennia, compacting into a chalk which is smooth to the touch. With time, water flow through fissures loosened crystals from their perches, and minerals are regularly detached when a vein is opened. On-Matrix specimens with considerable crystal size are a true rarity to be appreciated. The limited selection shown in these pages far exceeds the volume held by any single museum on Earth.

The Purple Hulk is an elusive cabinet display showing an impressive druzy layer of crystals still adhering to a drift of Bixbyite. Overall Dimension: 14.5cm x 14.0cm

Above: *The Lottery Ticket*. Large negative impression in Ice Cream above main crystal. Hexagonal subsurface shaping suggests a hidden treasure.
Crystal Size: 20.24 x 12.95 x 11.21 mm

Below: Two Red Beryl crystals share a common origin point.
Top (repaired): 16.74 x 9.45 x 7.14 mm
Bottom: 15.54 x 8.18 x 7.23 mm



Above Top: A stair-stepped and terminated prismatic crystal is *King of the Mountain*. 13.72 x 10.65 x 9.74 mm

Above Bottom: Fantastically large example of a high-quality cabochon-grade specimen, with detailed patterning. Note *The Nest* of Ice Cream surrounding the crystal. 19.21 x 14.66 x 11.7 mm

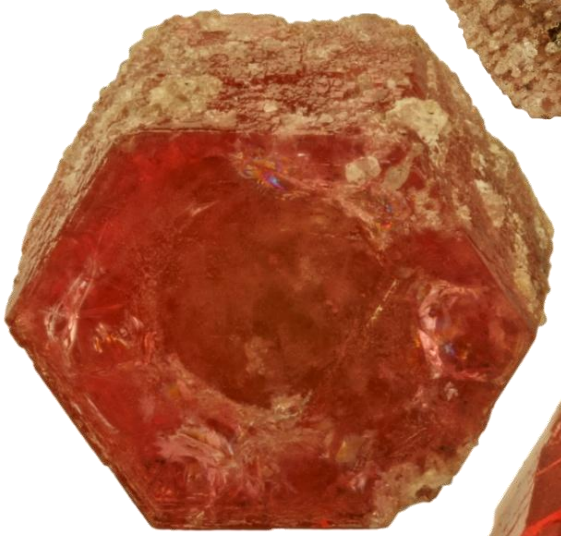
Height, width and depth measurements can be compared to sizes listed in the Prism lineup featured in **Section V**.

IV ~ Wafers

Red Beryl has been found in three localities: The Black Range in New Mexico, and the Thomas Range and the Wah-Wah Mountains in Utah. The Black Range produces crystals the size of fly specks, while heavily-included and sandy rosette wafers are found in the Thomas Range. Only the Wah-Wah deposit yields gem-quality material. To date, no commercial-scale mining venture has been profitable, as Red Beryl production is cost-prohibitive: One ton of rhyolite with the hardness of concrete must be processed to produce a single carat of Red Beryl rough, which likely will not even be facet-grade.

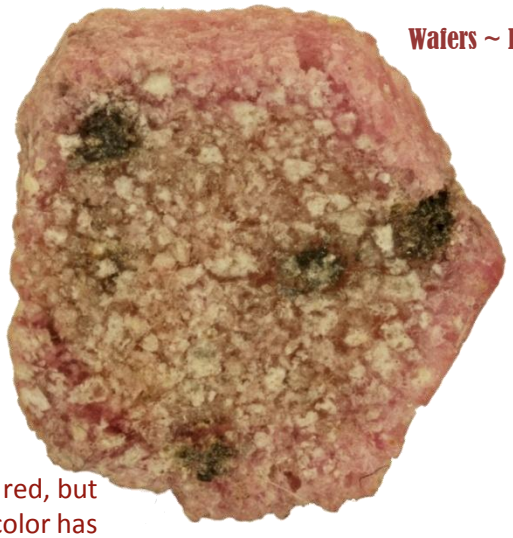
These five specimens originated from the Thomas Range, where wafer specimens commonly exhibit clustering, rosette depression patterning and dramatic geometric surface disruptions, illustrated in the mesmerizing examples shown here.

The specimen below is one of the finest examples of the rosette crystal habit discovered in this mineral. Interestingly, rosettes typically form in dry environments. Red Beryl production is anhydrous.



"Sandy" wafers like the example at center suffer secondary crystal overgrowth. Gem quality material is much like that on this page; cuttable stones exist, but not in the size, quantity or form that would encourage such an effort. Many crystal habits known to this variety are unique to this deposit.

A group of cabochon-grade wafer specimens from the Wah-Wah Range. These faces typify the wonderful patterns which can be polished from stones permanently stuck in mid-process of pulling gem quality material into existence.



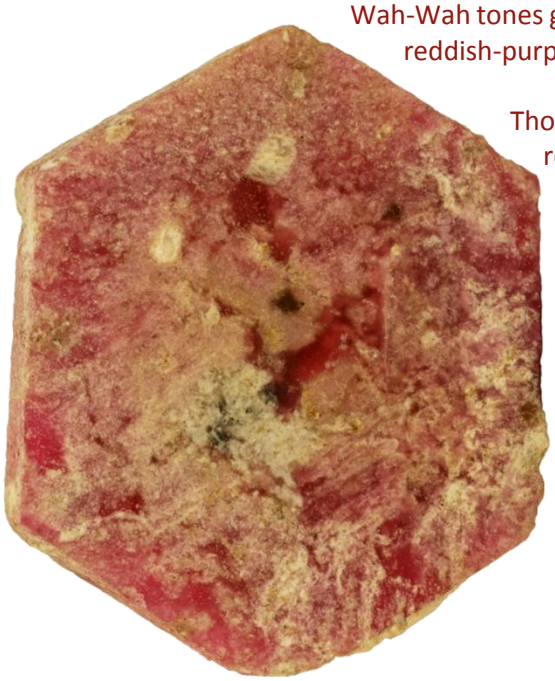
Utah beryl is red, but this primary color has two secondary hues: **Orange** and **Purple**.

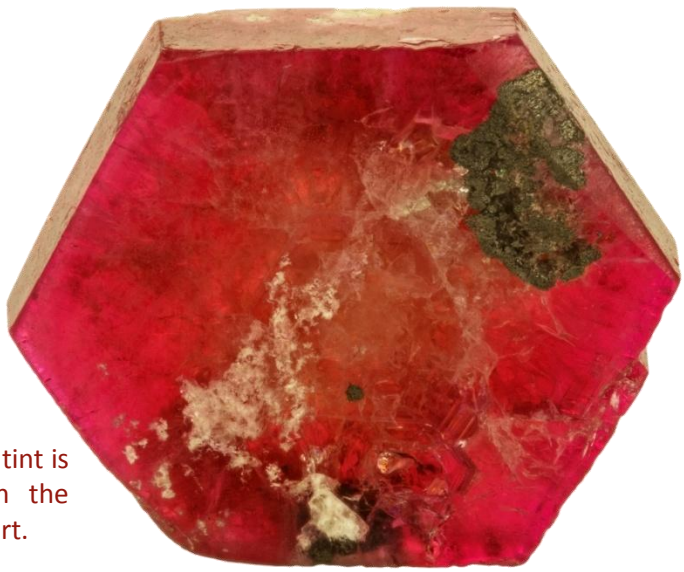
Secondary means another color is mixed-in with the red. Here is a quick exercise to assist those who might suffer from "color-blindness"!

Wah-Wah tones generally appear reddish-purple.

Thomas Range material regularly exhibits a hue which is a fire engine red-orange.

Step back and look at all the wafers on these two pages. Can you see the difference now?





Above: Wafer slice from a heavily-included prism.

Right: Wafer slice from a large gem prism.

The area in the center that appears to have a different tint is called a color zone. Compare this anomaly with the alterations in the center of its Thomas Range counterpart.

While the majority of crystals are heavily-included, a low percentage are facet grade. All the gemstones ever cut originated from the Wah-Wah deposit in Western Utah. The rarest top grade facet material is evaluated in **Section XII**.

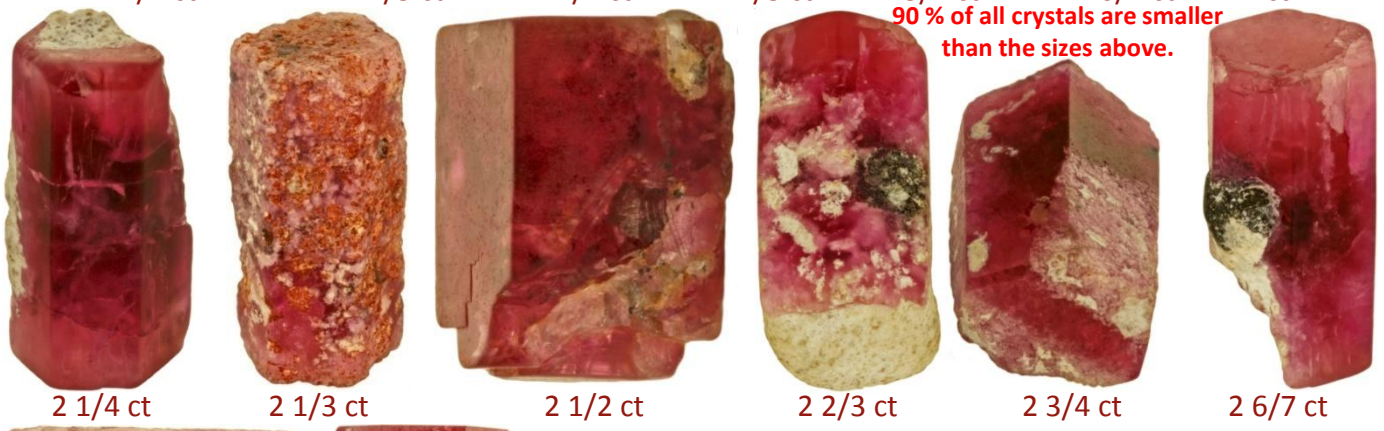
Quality rough often possesses a paler red-orange core with a red-purple rind in various levels of saturation, shown in the gem beryl on this page. This is due to Hourglass Patterning, further discussed in **Section X**.

V ~ Prisms

When a beryl grows under conditions favorable to long-term crystallization, hexagonal wafers continue to stack one upon another until a tower has formed, which is called a prism. Most prismatic specimens are produced in the Wah-Wah range. This parade of prisms is a collection of "floater" or off-matrix crystals from the very smallest of sizes graduating up to mammoth examples. After the first 25 years of mining, the largest crystal ever discovered weighed only 30 carat and measured 22 millimeters in height by 12 millimeters in width and depth. This display contains four stones with equal heft, including one weighing nearly 45 carat.

The average rough crystal size falls within the above range.

90 % of all crystals are smaller than the sizes above.



V ~ Prisms


4 ct


4 1/4 ct


4 1/2 ct


4 3/4 ct


5 ct


5 1/3 ct


5 1/2 ct


5 2/3 ct


5 2/3 ct


5 3/4 ct

6 1/4 ct

6 1/3 ct

6 2/3 ct

6 3/4 ct


7 1/3 ct

7 1/2 ct


8 1/2 ct


7 2/3ct

8 1/4 ct


8 1/2 ct

9 ct

9 1/4 ct

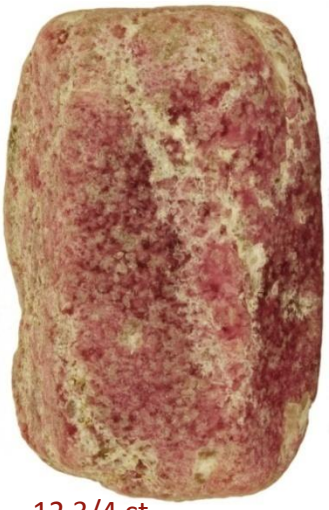
9 1/2 ct

9 1/2 ct

10 3/4 ct

12 ct

14 3/4 ct



12 3/4 ct

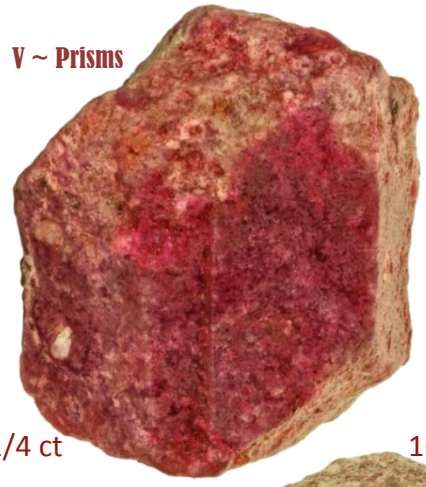
10 6/7 ct

13 ct

13 3/4 ct

16 ct

V ~ Prisms



16 1/4 ct

16 1/3 ct

17 ct

17 1/2 ct

17 2/3 ct

17 2/3 ct

19 ct

19 1/2 ct

21 ct

21 1/3 ct

21 1/2 ct

22 6/7 ct

23 ct

27 ct

24 3/4 ct

24 3/4 ct

28 1/3 ct

29 1/2 ct

V ~ Prisms

Front

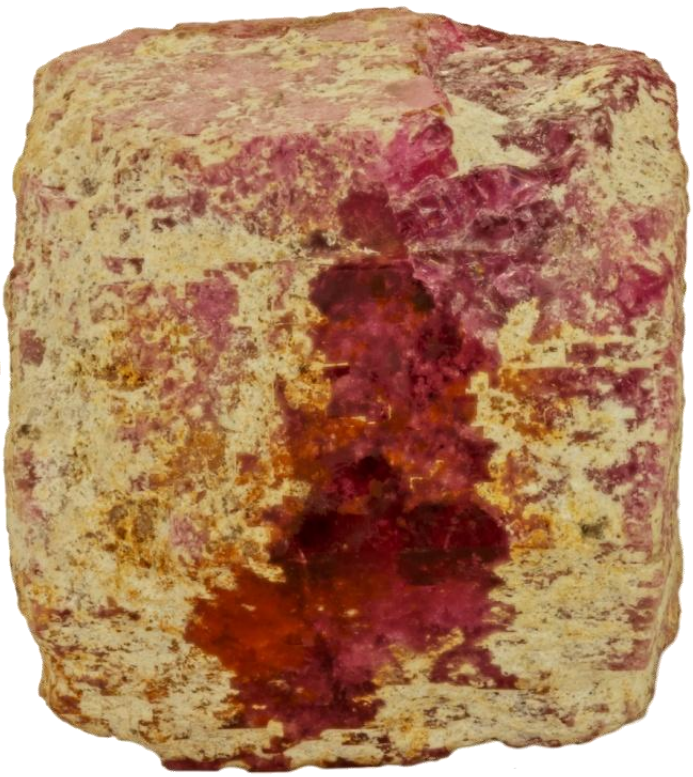
29 6/7 ct

Back

In June of 2013, knowing nothing about gemstones, I encountered my first Red Emerald crystal, in a phenomenal size over 30 carat. After researching this wonderful jewel, I became dismayed none of my fellow citizens were aware of the great treasure their nation alone produced: a red relative to the oldest stone admired by humanity, with a kind of crimson whose nature is more like our familiar green than any other beryl variety which has ever existed before.

30 6/7 ct

30 1/2 ct



36 3/4 ct

Red Beryl Floaters

Fractional Estimate	Actual Carat Weight	Dimensions (millimeter) Height	Width	Depth	Gem Quality	Evaluation Notes
1/4	0.22	3.8	2.31	2.61	X	*Beveled Termination*
1/3	0.355	4.42	2.52	2.74	X	*Unusual Surface Luster*
1/2	0.475	4.59	3.4	3.27	X	
2/3	0.64	6.81	3.31	2.93	X	*Stair-Stepping and Hexagonal Termination Stacking*
3/4	0.74	5.6	4.21	3.44	X	
6/7	0.865	6.35	3.68	3.27	X	*Surface Striation*
1	1.01	4.98	4.55	4.75		*Bixbyite Attachment and Rhyolite Marbleizing*
1 1/4	1.11	5.49	5.4	4.88		*Hexagonal Stacking*
1 1/3	1.355	7.99	5.08	3.97	X	*Hourglass and Hexagonal Negative (Phantom Sidecar)*
1 1/2	1.405	8.87	4.13	4.5	X	
1 2/3	1.59	8.75	5.31	4.56	X	*Beveled Termination with Sidecar*
1 3/4	1.79	8.38	4.94	4.85		*Starfield of Inclusions with Surface Etching*
1 6/7	1.91	8.34	5.8	4.9	X	*Surface Striation*
2	2.025	9.95	5.73	4.18		
2 1/4	2.115	10.11	5.08	4.92	X	*Beveled Termination*
2 1/3	2.36	10.34	5.43	4.95		*Surface Pitting with Iron Staining*
2 1/2	2.445	7.12	7.03	5.97		*Stair-Stepping with Perpendicular Ghost Chevron*
2 2/3	2.67	10.84	6.25	5.09		*Bixbyite Attachment and Hexagonal Crystal Negative*
2 3/4	2.845	8.82	6.74	5.69		*Surface Modification, Cubic Negative and Beveled Termination*
2 6/7	2.95	11.03	6.1	5.49	X	*Bixbyite Attachment and Surface Modification*
3	3.125	9.01	7.83	4.62	X	*Hourglass Zoning*
3 1/4	3.235	12.11	7.05	5.04	X	*Stair-Stepping and Sidecar*
3 1/2	3.605	9.79	7.7	6.4		*Red Arrowhead and Iron Staining*
3 3/4	3.75	8.64	7.71	6.09	X	*Stair-Stepping, Hexagonal Stacking and Hourglass Zoning*
3 6/7	3.975	11.95	7.07	6.43		
4	4.12	10.3	7.85	7.08	X	
4 1/4	4.15	7.46	9.05	7.61	X	
4 1/2	4.405	11.44	7.29	6.64	X	*Cubic Crystal Negative (Phantom Bixbyite)*
4 3/4	4.725	11.38	7.34	7.04	X	
5	5.15	10.37	9.23	7.63		
5 1/3	5.38	16.22	12.86	4.34		
5 1/2	5.61	16.65	10.26	6.07		*Topaz Inclusion*
5 2/3	5.635	13.32	7.5	7.14		*Sidecar*
5 2/3	5.69	11.37	9.76	6.18		*Surface Striation*
5 3/4	5.765	13.86	8.3	8.08	X	
6 1/4	6.30	11.11	10.7	5.87	X	
6 1/3	6.38	11.23	9.58	8.37		*Stair-Stepping, Hexagonal Stacking and Crystal Negatives*
6 2/3	6.67	14.2	3.16	7.84	X	*Large Rare Rectangular Bixbyite Attachment Point*
6 3/4	6.86	17.55	8.9	8.22	X	*Bixbyite Attachment and Beveled Termination*
7 1/3	7.39	11.47	9.28	9.08		*Topaz Inclusion*
7 1/2	7.47	15.83	10.78	9.52		*Twin*
7 2/3	7.69	15.39	7.82	6.61		*Double-Terminated*
8 1/4	8.24	17.54	11.76	8.64		
8 1/2	8.50	12.41	12.21	9.11		*Iron Staining*
8 1/2	8.57	12.63	12.32	7.75		
9	9.18	15.46	9.87	9.24	X	*Significant Surface Clustering*
9 1/4	9.29	15.28	12.14	11.32		
9 1/2	9.46	12.36	10.15	9.76		
9 1/2	9.53	13.57	10.39	10.12		
10 3/4	10.79	19.15	9.23	8.74	X	*Parallel Growth Disturbances and Iron Staining*
10 6/7	10.86	12.78	10.81	9.31	X	*Small Embedded Bixbyite and Topaz Crystals*
12	11.95	13.19	11.08	9.83	X	*Strong Marbelization and Hexagonal Stacking*
12 3/4	12.63	15.79	10.24	9.5	X	
13	12.99	16.09	10.44	9.27	X	*Surface Pitting*
13 3/4	13.82	16.77	11.78	9.86	X	*Secondary Crystallization and Micro-Pitting*
14 3/4	14.72	15.8	12.08	11.69	X	*Unusual Surface Staining*
16	16.05	15.91	14.5	11.6	X	*Perfect Sidecar Exemplar*
16 1/4	16.28	14.95	14.25	12.21	X	*Ultraviolet Reactive*
16 1/3	16.31	15.2	12.52	10.92	X	*Bixbyite Shell Coating*
17	16.96	14.15	12.87	12.33	X	*Growth Disturbances and Hexagonal Stacking*
17 1/2	17.56	13.53	13.96	12.17	X	
17 2/3	17.62	18.79	11.98	10.39	X	*Multiple Iron-Stained Bixbyite Attachments*
17 2/3	17.63	19.08	14.24	12.44	X	*Parallel Growth Disturbances*
19	18.97	21.77	10.9	9.52	X	
19 1/2	19.50	16.76	15.02	11.86	X	*Unusual Coloration*
21	21.13	15.47	14.39	14.12	X	
21 1/3	21.37	16.22	13.33	12.33	X	*Growth Disturbances and Crystal Negatives*
21 1/2	21.58	18.93	15.23	14.64	X	*Iron Staining, Large Sidecar and Crystal Negative (Sawn)*
22 6/7	22.92	22.94	17.51	12.18	X	
23	23.00	19.12	15.91	14.78	X	*Weathered Spray Pattern of Growth*
24 3/4	24.72	18.07	13.84	12.21	X	*Multiple Iron-Stained Bixbyite Attachments*
24 3/4	24.735	16.68	16.27	14.8	X	
27	27.12	21.62	14.13	13.51	X	*Significant Surface Clustering and Growth Disturbances*
28 1/3	28.32	19.21	17	14.53	X	*Weathered Sidecar and Parallel Growth Disturbances*
29 1/2	29.45	19.3	14.18	12.21	X	*Even Pink Marbelization*
29 6/7	29.86	18.83	17.82	15.93	X	*Parallel Growth and Heart Twin Stacking*
30 1/2	30.45	21.48	15.42	13.34	X	*Lantern Twin with Perpendicular Sidecar*
30 6/7	30.83	25.03	13.52	10.64	X	*Significant Iron Staining and Stair-Stepping*
36 3/4	36.70	18.12	16.07	15.78	X	*Growth Disruption and Iron Staining*
44 3/4	44.79	26.1	16.11	12.82	X	*Wafer Sidecars with Hexagonal Termination Stacking*

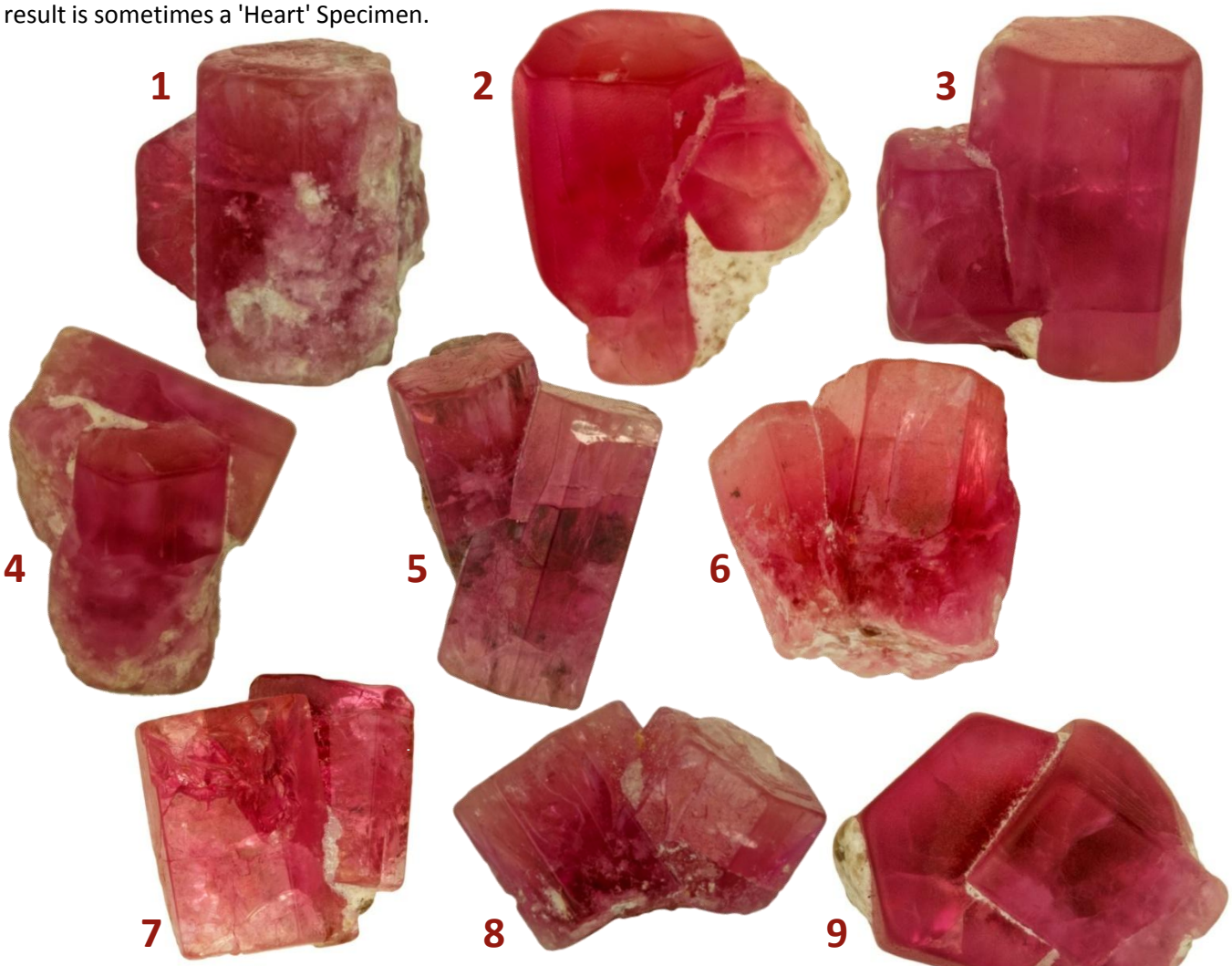
Fixated on correcting this injustice, over the next 3 1/2 years, I amassed an inventory equivalent to 18 months of mine production. Although a mere 5% of above-ground facet supply, by securing a variety of material in specimen, rough, cabochon and faceted forms, this collection can account for nearly 50% of historic production. There is unspeakable scientific value in such a large percentage of one of the world's rarest minerals, to say nothing of gemstones.

44 3/4 ct

After the first 25 years of mining, the biggest specimen recovered weighed only 30 carat and measured 22 millimeters in height by 12 millimeters in width and depth. This 80 tower strong catalog of free-floating crystals contains four which boast equal or greater heft, but an attempt has been made to include within these pages *every* fine example over five carat encountered so far, whether in natural or faceted form.

VI ~ Twins

On occasion, a red beryl crystal will form from another; when two crystals present an independent but conjoined growth pattern, they are collectively referred to as 'Twins'. Occasionally, common patterns of crystal growth are given a special name. When a second crystal grows affixed to the side of a larger specimen, this occurrence is referred to as a 'Sidecar'. When two similarly-sized crystals grow in parallel, the result is sometimes a 'Heart' Specimen.



Imagine if the Sidecar in the first photo had kept growing out and away…the hexagon stop sign would "*pop out*" the other side. If we rotated such a specimen 180° clockwise would look similar to Specimen 2. If the Sidecar in 2 were dropped to the ground, grew 50% in size and the specimen was rotated 90° further, it would look like Specimen 3. If the Sidecar mirrored its growth to become a complete crystal, and the entire specimen were flipped in a cartwheel, one beryl would be carried on the shoulders of another, like *Red Atlas* in Specimen 4. If instead the pair grew evenly along the same vector, they might look like the *Fingers Crossed* in Specimen 5. If one grew larger while the other did not, they would become *The Glove* in Specimen 6. Specimen 7 demonstrates how to hold a *Pocket Pair* during poker. Completing the terminations for both crystals in that configuration makes the short fat *Victory Formation* seen in Specimen 8. If the twin on the right side became *Two Shy* it may bury its termination face into the shoulder of their buddy on the left, hiding like Specimen 9. *The Double-Beryl* of Specimen 10 shows the visage of two parallel C-Axis aimed right between the viewer's eyes.

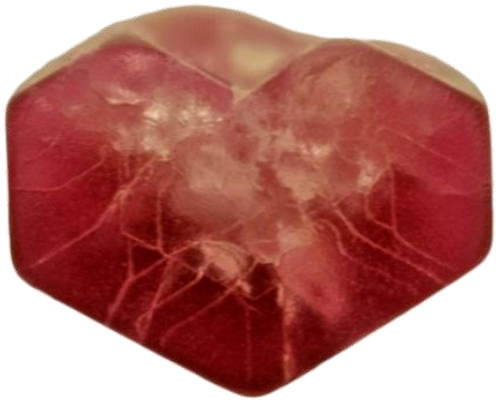
When twin formations like Specimen 10 grow at an even rate with a shared, flat termination end, the side unattached to and unhindered by the host matrix may be able to complete the larger hexagonal structure, leaving only one staggered split unfinished. Such a twin has taken the shape of a Heart.

Middle Left (Above):
A Colombian Heart

Middle (Above):
Red Beryl Heart Floater
(Attachment End)

Beveled Emerald
Termination Sketch
Mineralogical Record Volume 47
Number 1

Bottom Left (Below):
Small Heart Tower



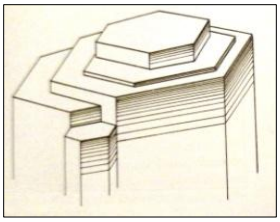
Bottom Middle (Below):
Red Beryl Heart Floater
(Termination End)

Top Left, Top Right and Middle Right:
A very fine Heart twin on matrix.

This specimen exhibits a beveled termination similar to ones observed in Colombian emerald rough.

VII ~ Clusters

When three or more crystals form in a conjoined mass, that specimen is referred to as a cluster. Clusters often follow patterns similar to those in twin combinations, but when viewed as a group, their breathtaking hexagonal architectures assume forms observed nowhere else in nature.



Parallel Emerald Growth Sketch
Mineralogical Record V47 N1

Specimen 1 illustrates crystal growth of multiple prismatic specimens in parallel, similar to Emeralds observed at the Otero Muñoz mine in Colombia.

Specimen 2 looks like only two crystals, but has a composite of small faces at the bottom termination.

Specimen 3 has a trio of prisms which explode from a central growth point.

Four distinct hexagons can be observed with a pair in parallel and two against the grain in Specimen 4.

Specimen 5 lives up to the number.

Three short, fat prisms in Specimen 6 show two faces each, forever to sleep one upon another.

The six-sided hexagon in Specimen 7 comes with an additional burst of beryl.

Specimen 8 is actually a pair comparison of elevated hexagonal faces. Notice the structure on the right uses three elongated sides in conjunction with three shorter ones; This distortion also occurs in Pezzottaite, due to the presence of cesium substituted for beryllium.

Specimen 9 is a personal favorite, reminiscent of a *Scarlet Artillery* piece, defending a thin red line of heroes...

Specimen 10 is shown at right and below. This cluster is magnificent from every angle. The crystallized rhyolite underneath acts as potch on an opal, allowing this *Cacophony of Crystals* a subtle glow.

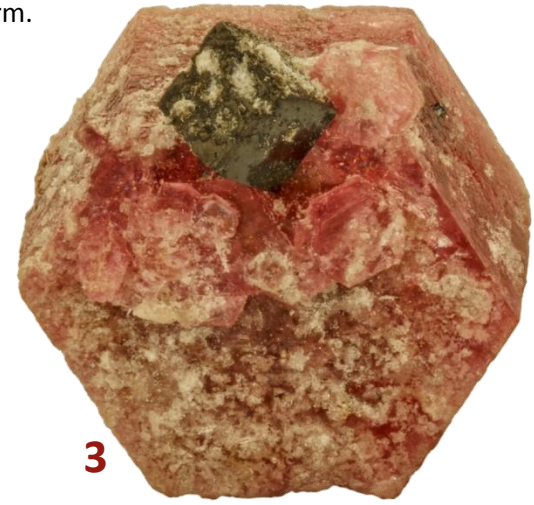
VIII ~ Bixbyite Combinations

Two years after red beryl was found, Dr. Alfred Eppler named the mineral Bixbite in honor of its discoverer, Maynard Bixby. In the same area, Maynard also discovered a black, cubic-forming mineral similar to pyrite…this was titled after him, as well, and subsequently dubbed Bixbyite. Growth for both in the same locality and similarity between the names Bixbite and Bixbyite created much confusion, so the mineral name Bixbite was discontinued in favor of red beryl. Black Bixbyite cubes often serve as a seed crystal attachment points from which red beryl can begin to form.

1

2

3



Specimen 1 illustrates the faceter's challenge; Bixbyite *Enveloped* the prism, including deeply and diminishing potential cutting yield.

Specimen 2 proves that *What Grows Up, Must Grow Down*.

In the forehead of *The Lucky Die* is housed a perfect Bixbyite cube, replete with appropriately-numbered rhyolite spotting.

4

As an original nucleation point, Specimen 4 at left shows *Phantom Traces* of a much larger crystal.

Bixbyite allows the twins in the middle below to be *Attached at the Hip*, while Specimens 5 and 7 make for a pair of bright wafers resting beautifully on black in solitude.

5

6

7

IX ~ Topaz Combinations

A gemstone growing from or in combination with another gemstone is a welcome rarity among specimen collectors. While the Thomas Range produces few crystalline examples, most specimens where Red Beryl has been observed with Topaz were discovered in that locality.

Top: Excessively high loads of inclusions produce even-toned opaque hues, like this pleasant pink sitting with two Bixbyite cubes atop a heavily-included pillar of marbleized Topaz from the Thomas Range.

Right: A spear of gem Topaz slices through the crystalline edge of a Red Beryl rosette, leaving a wake of surreal, hexagonal disturbances along the termination surface.

Below: A crossed Topaz twin serves as *Rabbit Ears* for one lucky Red Beryl specimen.

Bottom Right: A Wah-Wah cabochon preserves the tip of a Topaz crystal within its domed form.

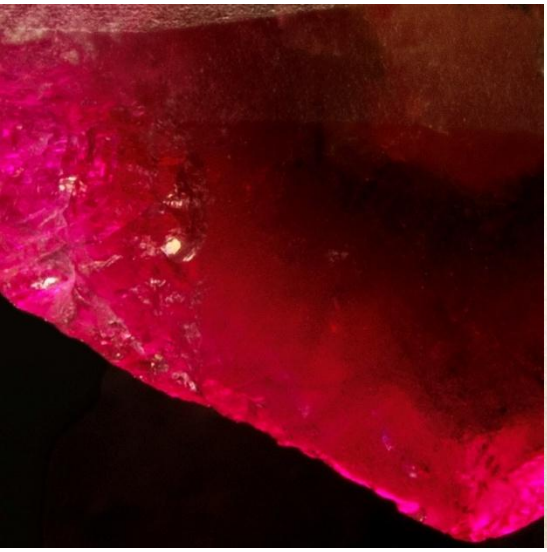
Bottom Left: *The Warrior* stands ready for battle! While at first glance, this Red Beryl and Topaz combo appears defenseless, the powerful explosion of an incoming fist may be difficult to recognize until the contrast against black is seen on the next page.

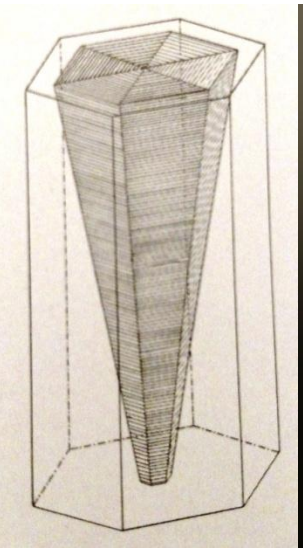
Above: This tiny Red Beryl wafer is situated in the *Captain's Seat*, steering this Topaz starship any way the wind might blow in.

Above:
This *Perforated* wafer appears on each page of this section. A vast number of hexagonal plates in various sizes can be observed, and radiating rainbow feather inclusions are present in the heart of this wafer rosette. New discoveries are made at every angle.

Above: During the summer of 2015, on my first visit to the public collection area known as the Cove at Wildhorse Springs in the Thomas Range, I personally dug this *Topaz Apex*.

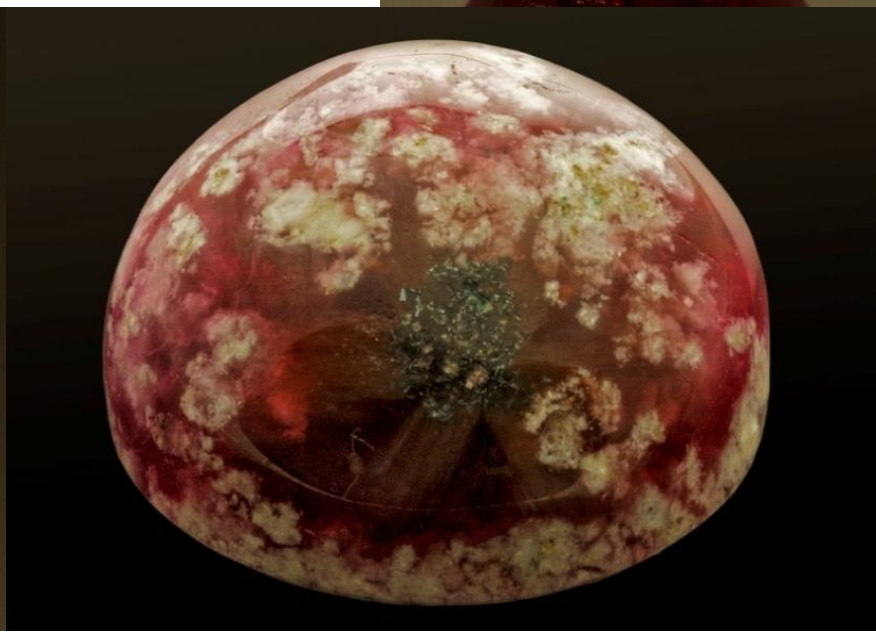
X ~ Hourglass Patterning





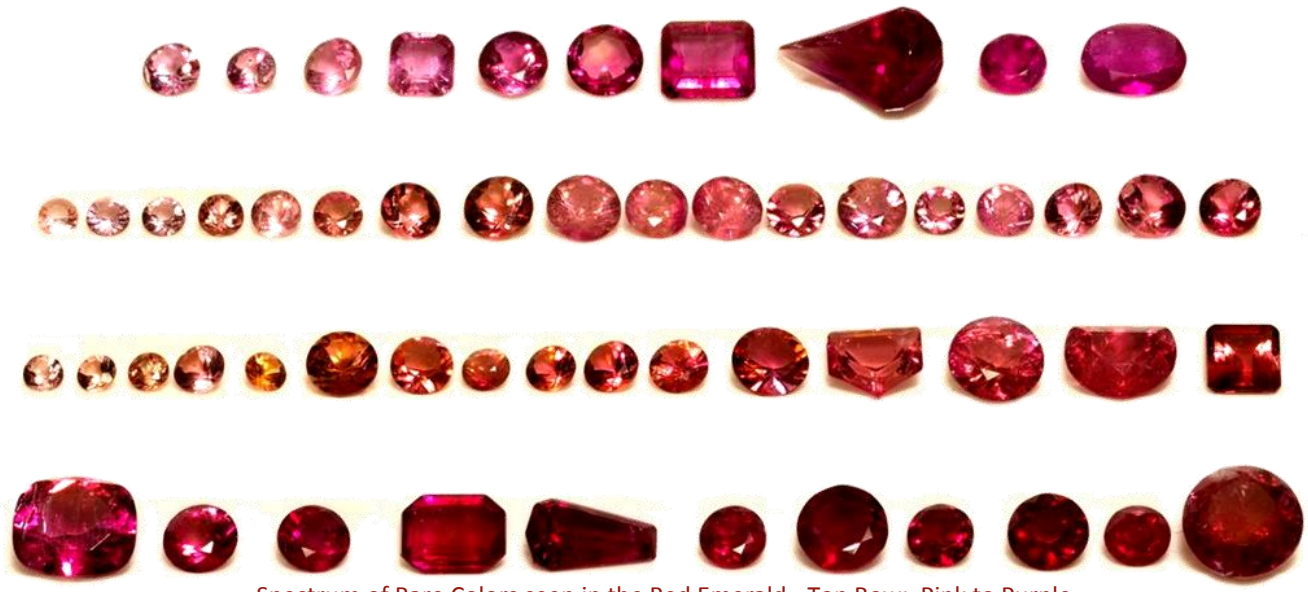
Above Left: Red-Orange color zoning at the base of a crystal.
Above Middle: Emerald Hourglass Zoning Sketch - *Mineralogical Record* V47 N1
Above Right: Cut cross-section of the same crystal, with hourglass.
Right: Strong hexagonal zoning seen at the termination end of a crystalline example.

Floater specimens usually reveal a point of Bixbyite attachment, which is sometimes pulled into a hexagonal shape. Similar to rough from the Muzo mine in Colombia, from this attachment the base of a pale core is formed. As crystal growth continues, the hexagonal zone is stretched into the figure of an hourglass. Stones containing an hourglass produce dramatic effects, including perceptible hexagonal regions and inclusion patterns like those in the ***Comet Tail Earrings***. Viewing the C-Axis, looking into the "spray" of inclusions, spread patterns similar to demantoid horsetails can be captured, as shown in the ***Starfire Emerald***.



Attempts to form trapiche lines have been occasionally observed, as noted in the radiating patterns above.

XI ~ The Scarlet Spectrum



Spectrum of Rare Colors seen in the Red Emerald - Top Row: Pink to Purple
Second Row: Peach to Raspberry
Third Row: Orange to Cranberry
Bottom Row: Magenta to Stoplight Red

Colors in gemstones are caused by trace metal impurities present in the chemical makeup during formation. The primary tone of a Colombian Emerald is created with chromium or vanadium, but the wide range of greens exist due to the secondary hues of blue and yellow, typically caused by nickel and iron, respectively.

The red color in the American Emerald is created by manganese. The same secondary hues exist, but when mixed with red, blue and yellow become purple and orange. The Kennecott Mining Company commissioned an analysis from Chemex Labs which identified traces of iron and chromium in Red Beryl samples, suspected to be the cause of secondary hues in Red Emerald gems. Some Red Emerald stones contain higher chromium levels than certain Colombian Emeralds!

Similar to the process of separating rubies, Red Emeralds are sorted in five different saturation levels for each secondary hue, making at least ten distinct and easily-discernible shades. In fact, color is absolutely unique to each stone, making matching sets difficult to acquire.

Red Emerald rounds exceeding one carat have been placed in improving clarities and colors. The first is heavily-included, but the rest display hexagonal and hourglass color zoning. Pulling a crystal from the ground with the purest red color requires multiple attempts that result in mid-grade material. With proper settings or life as a gem cabochon, these offer equal enjoyment of the intricate detail upon which one may focus their attention.

Now that you are an expert in crystal forms, twin and cluster patterning, as well as combination specimen identification, and have gained awareness of the Red Emerald hues and how they present themselves, satisfy this hunger to know more by investigating earlier portions of this book again with a more finely-tuned eye…there are endless hidden secrets to detect and discover!

XII ~ Facet-Grade Red Emerald

The rarest of the rare, under 10% of red beryl production is facet grade. Only this highest quality material may claim its status as an Emerald. Colombian Emeralds typically carry only one half of one percent impurities, but Red Emeralds sometimes contain up to 3%. The average yield for all cut Red Emerald to date is 12.5%; the typical Green Emerald yield ranges from thirty to forty percent. In any case, well over half the volume of rare gem crystals will be sacrificed if made into gemstones.

Above: A three-carat piece of top-grade facet rough known as the “Candy Cane”, named for the gem-striped center of the opaque, heavily-included prism from which it was removed.

Right: When handled properly, rough can be faceted into marvelous stones like this 1.28 carat, orange-core Red Emerald 7.3mm round. Hexagon zoning is oriented perfectly in the culet, as can be faintly seen in the reflection beneath the stone.

XIII ~ The Red Emerald Suite Treasure

Stone families considered precious from antiquity to the modern day include Emerald, Sapphire and Ruby, and these have been treasured longer than the existence of our historic record. Steel long served as the strongest creation of mankind, and these four gems were harder still than that hardest thing, so their beauty was wound with an inexorable reverence.

Red is repeatedly the rarest shade in-species for the precious gemstone families. Since the dawn of civilization, the red variant of sapphire owned the honorific title ruby. The colored varieties of diamond have been known for hundreds of years. Every alternate tint in gem beryls can be traced back more than a century…save for Red. Existing for millions of years, yet located mere decades ago in 1958, the Red Emerald was, is and ever shall be the final primary shade discovered in Earth's precious stone spectrum. To summarize:

The Red Emerald is history's missing precious gemstone.

Like pink diamonds, Red Emerald crystals are unusually small, with over 90% of faceted stones weighing less than 1/10th of a carat. Mechanized mining occurred from 1978 to 2001, and the **largest Red Emerald** produced from those operations weighed only **4.5 carat** (*Gems & Gemology* - Winter 2003).

Featuring **three stones** larger than **five carats**, two with matching proportions, and half-carat oval and emerald color-lines displaying the finest water and saturation, ***the Red Emerald Suite Treasure*** is the greatest inaugural jewelry collection ever assembled in any gemstone variety. No first sapphire, original diamond or landmark ruby remains; never before has any precious stone species been able to preserve through time the very first of her absolute best examples in size or quality, much less both. The discovery of Red Emerald in the modern era allows for this once-in-a-world, unique opportunity.

A collection of this prestige necessitates a protective case of equivalent, unmatched quality. Hand-fabricated in America to the highest standards of excellence, the stylish jewel box patterning of the Treasure Chest is marked with a bloodwood inlay contrasted against jet-black ebony trim. Each component rests in its individually-tailored chamber of the custom-crafted interior. The Treasure Chest is sealed by a seamless magnetic latch when closed and held open with durable torsion hinges while on display.

Twelve inches long, ten inches wide and three inches tall, the readily-perceptible preeminence of this masterwork reflects the unimaginable value of the riches guarded within.

This stunning, irreplaceable, eighteen-inch long necklace is hand-made in platinum with 18 karat yellow gold accent settings for the Red Emeralds. As with green emeralds, the reds have a range of secondary hues, various saturation levels and tones, and uneven color distribution with occasional zoning. Without a large supply impossibly difficult to obtain, these natural features make the task of finding even two Red Emeralds similar in appearance incredibly challenging.

Fifty-six top-color ovals of phenomenal clarity were matched for a total weight of 27.35 carat.

Likely the finest quality line ever gathered, these Red Emeralds are complimented by fifty-six quarter-carat diamonds sourced from Krementz stock in 1997. The diamonds appear VS in clarity, E to F in color, with a total weight of 14 carat.

To attain a size in the range of the largest prisms found in **Section V** is impressive on its own merit, but to also possess the facet gem quality seen in **Section XII** AND finest color observed in **Section XI** requires comprehension of the unfathomable rarity numbers fail to express.

At seven-and-a-half inches long, this bracelet is filled with twenty-eight Red Emeralds weighing a total of 14.03 carat, manually set in platinum and separated by 28 diamond baguettes of VS clarity G to I in color weighing 81 points.

Of the most crystalline quality and averaging over half a carat in size, these emerald-cut stones exist in a size range attained by less than one half of one percent of all faceted Red Emerald stones. This collection was assembled over a number of years to be the premiere example of the highest excellence available in this gem species.

This necklace and bracelet alone comprises a set unable to be matched by any rival or personal competitor. The inherent scarcity of the Red Emerald classifies this assortment as irreplaceable and truly worthy to be coveted even by the most powerful of the elite and famous of personalities.

Ronald Ringsrud wrote in his seminal work *Emeralds: A Passionate Guide*, "The fascination and wonder that accompanies the discovery of new knowledge…is exactly the proper use of science: to lead us to amazement of Nature's creation and to experience a sense of wonder. There is no better place to rediscover wonder than in [the] remarkable phenomenon that occurs deep inside the finest Emeralds."

No stone exemplifies this experience more than the ***Starfire Emerald***, a 5.76 carat mixed-cut Red Emerald oval set in a ring. Unusual and attractive features in the *jardin* are oriented as one would a Demantoid Horsetail. The fibrous inclusion pattern rages with fire, transmitting multi-colored chatoyancy at various angles, adding mystique and splendor to the rolling light return in this massive gem.

History's largest pair of Red Emeralds were entrusted to Ben Tracy, a master jeweler and part of the team who fabricated the *Heart of the Ocean* necklace used in the film *Titanic* while employed at Garrard & Company in London.

His outstanding work continues with this incomparable matching set. Two months were dedicated to design and color sorting, followed by 150 hours handcrafting this impressive representation in 30.8 grams of 950 platinum by Mr. Tracy himself. Each ***Comet-Tail Earring*** measures two and a half inches in length, utilizing the full range of hues under the command of this remarkable jewel.

The total weight of ***the Red Emerald Suite Treasure*** is over 65 carats, ensuring the wearer will be more impressively-decorated by Red Emeralds than anyone who has ever lived.

Welcome to the Red Emerald…

…the greatest gemstone you've never seen! Ronald Ringsrud once observed, "Reminiscent of the physiology of someone falling in love…a person can instantly shift from an analytical state into a state of reverie upon *surrendering* to a gem." Rejoice! You are the first generation in history to witness the landmark debut of the **Red Emerald**, an extraordinary gem variety.

W. E. Wilson, author for the Mineralogical Record, while describing Red Beryl specimens at the 1991 Denver show, claimed that "to see these in the bright Colorado sunlight is almost a religious experience." My goal is to provide that same exhilarating feeling by presenting breathtaking **Red Emerald** jewelry in unprecedented sizes and of quality never achieved by the whole of humanity before, demonstrating the unbridled glory of this precious gemstone.

Constraints of supply blessed me as the only designer with full access to the rarest color palette on Earth. By creating art from this jewel, I am obligated by a sacred responsibility to be ***good***. I strive to accomplish my very ***best*** for everyone on this planet today and those yet to come. I am motivated by a duty to honor you and this irreplaceable **Red Emerald** material, an undeniable gift from God.

My sincerest hope is that you enjoy it, love it and **MARVEL** at one of the wonders still waiting to astound us in the modern world.

Your friend,

Seth William Rozendaal

www.TheRedEmerald.com