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HAPPY BIRTHDAY TO SEPT.

BIRTHDAY FOLKS!!!



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CASTLE MADE OF PEBBLES, U.K. 2020

CLUB NEWS: Sorry, there isn't any. Some other clubs in Calif. still have shows scheduled in Oct and Nov that haven't been cancelled yet. San Diego is doing fairly well compared to many other areas. But is surrounded by "hot spots" such as Imperial and Riverside counties with extremely high COVID rates. Sorry we are unable to make plans yet. Hopefully club memberships can be reimbursed or applied to next years, if the situation continues.

NEW JERSEY'S STIRLING HILL AND FRANKLIN ZINC MINES

By: Gene Ciancanelli

In the realm of minerals and gemstones, there are certain mines that standout for various reasons. It might be the quality of the material, the wide variety of minerals present, a unique mineral, or spectacular specimens. The Sterling Hill and Franklin Mines are famous for the more than 365 different minerals present, 10% of all the known minerals, of which 35 minerals are found nowhere else and 91 of the minerals fluoresce. (The Franklin area mines are sometimes referred to collectively as the Franklin Furnace Mine.)

Mining in Sterling Hill began in the 1630s, when ore minerals scraped off by Pleistocene glacial activity were traced back to the main deposit. The mine was at first though to be a copper deposit, but it was soon recognized as an iron and zinc deposit. King George III, with whom we later fought the Revolutionary War, granted the property to William Alexander, who called himself Lord Stirling, from an ancient Scottish title no long recognized in Britain. Later, Lord Stirling was a Major General in the Continental Army. He commanded the 1st Maryland Regiment that stood firm and performed a heroic rear-guard stand that allowed Washington to escape from the Battle of Long Island with the Continental Army intact. Lord Stirling was taken prisoner and later exchanged for British Officers. He served throughout the Revolutionary War as a heroic and trusted aide to General Washington.

Over the course of the 18th and 19th centuries, the mine changed hands several times until it was reorganized as the New Jersey Zinc Company in 1897. The mine, which produced large quantities of metal during the First and Second World Wars, closed in 1986 over a tax dispute and it reopened as a museum in 1990. There are 35 miles of underground workings down to a depth of 2,675 feet. Following closure of the mine, the pumps were shut down and the mine is now flooded below a depth of approximately 100 feet. In addition to a museum, the mine tour includes a 1,300-foot tunnel including a 240-foot section called the Rainbow tunnel, which is lighted by short wave UV lights to reveal the tunnel's wall rocks in various shades of brilliant fluorescent colors. The mine periodically holds collecting sessions both for geology clubs and professional mineralogists and geologists.

Geology

The authors of this section are: Dr. Earl R. Verbeek, Resident Geologist at SHMM, in collaboration with Professor Lincoln Hollister, Professor Thomas S. Duffy, and Laurel Goodell (all of Princeton University), and Haig Kasabach (retired Director, New Jersey Geological Survey).

The Sterling and Franklin deposits were fabulously rich in zinc (more than 20%) by weight, and also in iron and manganese. Both deposits are quite large: The Sterling mine in Ogdensburg produced more than 11 million tons of zinc ore, and that at Franklin twice as much. More than 365 different mineral species have been found in these two mines, placing the Franklin-Ogdensburg area in the top five most mineralogically complex localities on Earth.

Mining of these zinc deposits began sometime before 1739, but exactly when and by whom is no longer known. Those early miners must have gazed in wonder at the strange ores they had uncovered in their shallow mine pits. However, because none of the three principal ore minerals (franklinite, willemite, and zincite) were as yet known to science, they had no way of understanding the nature of these deposits, let alone their genesis. It took another 70 years for the first scientific paper to be published on one of these minerals, zincite, in 1810. Since then the number of scientific publications related in some way to these mines has grown to more than 1,000. Yet, despite more than 200 years of scientific inquiry, our understanding of how these deposits came to be is fragmentary. Only recently has a consensus emerged on a conceptual framework for their formation.

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Rainbow tunnel lighted by short wave UV lights to demonstrate the fluorescent wall rocks.



Number 5 tunnel lighted by short wave UV lights to demonstrate the fluorescent wall rocks. The red color is calcite (marble) and the blue and green colors are zinc ore.

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Sterling Hill mine tunnel lighted by short wave UV lights to demonstrate fluorescent wall rocks.

The zinc deposits at Franklin and Ogdensburg are wholly encased in a geologic unit called the Franklin Marble, which fluoresces red in the mines and underlies much of the Wallkill River valley between Sparta, New Jersey on the southwest and Warwick, New York on the northeast. The Franklin Marble is about 1.3 billion years old. There was debate for years on whether the zinc deposits are the same age as the marble that encloses them or whether they are younger, but it now appears that they formed at the same time. The orebodies are stratiform, which means that they formed as blanket-like deposits conformable with the layering in the Franklin Marble as a whole, and were folded along with the marble to their present configurations. No similar deposits have been found anywhere else on Earth; they are unique. This limits the ability to infer aspects of their formation by analogy to deposits studied elsewhere. (In 1966, I {Gene Ciancanelli} was mapping the geology of the Silver Bell Mining District northwest of Tucson, Arizona. In a very large old prospect pit, probably dug decades earlier, I found Franklinite, Zincite, and Willemite, which are the principal ore minerals in the Franklin and Sterling Hill Mines. The rocks at this locality were also brilliantly fluorescent. My employer was not interested in exploring this deposit.)

A hypothesis that the zinc ores originated as sediments deposited along with the host limestone and were later metamorphosed to ore minerals and marble was made as early as 1855, but for many years it failed to gain traction. An important step to our modern understanding took place in 1966, when William Callahan, a New Jersey Zinc Company geologist, likened the ores to the metamorphic equivalent of the sediments currently forming in brine pools in the Red Sea. Here we have the beginnings of the *volcanic exhalative* view of our zinc deposits – namely, that they formed as hot, metalliferous brines erupted onto an ancient sea floor. In this view the ores are *syngenetic* – that is, they formed at the same time as their host rocks. Research since that time has only strengthened this general concept of the origin of the ores.

Over the last two decades, the New Jersey Highlands have been thoroughly remapped by geologists of the New Jersey Geological Survey. The new detailed maps, combined with carbon and oxygen isotopic studies and a series of precise age determinations to put the rock units in proper chronological context, have produced a conceptual plate-tectonic model of the evolution of the region. It is now generally accepted that the ore deposits at Franklin and Sterling Hill originated as hot, metalliferous brines that were discharged onto the floor of a shallow sea

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about 1.3 billion years ago. The sea floor at that time was covered by white carbonate muds, similar in many respects to the Bahama Banks today. As the hot brines came into contact with the much colder seawater, the metals dissolved in them precipitated as small particles that then fell to the sea floor, there to accumulate as a series of metal-rich layers within the thick sequence of white carbonate muds. The original mineralogy of these metalliferous layers is still uncertain, but whatever their nature, metamorphism of these original materials gave us the orebodies that we see today.

(You may be familiar with the black smokers that are hydrothermal vents depositing metallic sulfides along midocean ridges and at oceanic plate boundaries. That is a similar mode of occurrence to the conditions that formed these New Jersey zinc deposits.)



The illustration above depicts the probable plate-tectonic setting at the time of ore deposition. Here we see, in cross section, an oceanic plate (purple color) at right colliding with a continental plate (yellow color) at left. Because oceanic crust is significantly denser than continental crust, the result of such collision is that the continental plate overrides (floats above) the denser oceanic plate, which then dives or "subducts" beneath the continental plate. Partial melting (black and gray magma) of the oceanic plate as it descends beneath the continental plate gives rise to a chain of volcanoes (the Losee arc) that shed sediment into a shallow back arc sea. The area of the shallow sea is a "*back-arc basin*", a region beneath which the Earth's crust is being pulled apart. This crustal extension forms deep fracture zones that allow hot, metalliferous brines to ascend to shallow depths and erupt as superheated hot brine springs onto the sea floor, there to form layered deposits of metal-rich muds. This was the situation about 1.3 billion years ago, when the carbonate muds (later to become the Franklin Marble) and the metal-rich layers within them (later to become the zinc orebodies) were first deposited.

Modified from the source: Volkert, R.A., Aleinikoff, J.N., and Fanning, C.M. (2010), Tectonic, magmatic, and metamorphic history of the New Jersey Highlands: New insights from SHRIMP U-Pb geochronology. Geological Society of America Memoir 206, p. 307-346.

In the cross section above, similar geologic processes are currently active today. An example is at the western edge of the Asian continent. In the above cross section, the large yellow area labeled "Loose Arc" would correspond to the Islands of Japan. The western end of the area colored in yellow and labeled "crust", would correspond to the Asian mainland of the Korean peninsula and China. The "back-arc basin" area, where the ore deposits are shown, is the Sea of Japan.

About one billion years ago in the Franklin, New Jersey area, as the plates continued to move, a second continental plate collided with the one described above. Because continental plates are of about equal density, their collision resulted not in one plate sinking beneath the other, but with both plates crumpling, splintering, and interleaving along the collision boundary. The result of these crumpled continental edges was the ancestral Appalachian Mountain chain, similar to the Himalayan Mountains we see today, where the Eurasian plate is colliding with the Indian plate. Along the Appalachian collision boundary, some of the rocks that had been near the surface became deeply buried and metamorphosed under the high pressures and temperatures that exist deep within the Earth. The Franklin and Sterling zinc deposits were buried to depths of 15-18 km and heated to temperatures of 750°-800° C, which radically changed their original minerals to those present today.

Events, during the last billion years of Earth history, also dramatically affected the local rocks. They have been altered by metamorphism, hydrothermal (hot water) solutions, repeatedly broken by several periods of faulting, invaded by pegmatitic magmas, uplifted to the surface by erosion of the overlying rocks, glaciated during the Pleistocene Epoch, and subjected to prolonged weathering as rainwater descended into the rocks and altered them yet again. The result is one of the most geologically and mineralogically complex and fascinating localities on Earth.

Fluorescence

Nearly everyone who has first experienced the vivid, beautiful colors displayed by fluorescent minerals wonders what can produce this glow and how does this process work? It is important to realize that minerals generally don't glow on their own, but in response to some external energy source. Usually that energy source is ultraviolet light, which is much like visible light, but more energetic and lies beyond the range of light detectable by the human eye. About 15% of the approximately 5,000 known mineral species are known to fluoresce under ultraviolet light. Others fluoresce under the influence of X-rays, an electron or proton beam, or even mechanical stress (e.g., when scratching, striking, or breaking a mineral). The key point is that fluorescence arises as the *electrons in a mineral undergo energy transitions*, absorbing energy from some source and re-emitting part of it as visible light.

Back in the 1950s, which to today's younger generations is almost the dawn of creation, I was mineral collecting at Franklin Furnace, new Jersey. In those days, before lawyers and bureaucrats ruined mineral collecting, the town maintained a mine dump open to the public for mineral collecting. Almost every rock on the dump was fluorescent and there were dozens of minerals easily collected including of course franklinite, zincite, and willemite for which the mine was famous. In the town there was a bar, beer being a normal field trip stop. The bar was about 40 feet square and all four walls were lined floor to ceiling with glass cases filled with minerals. The bar's interior lighting was ultra violet and this caused the entire bar to glow as a fluorescent wonderland. I have never seen a fluorescent museum display to equal that bar.

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Franklin Furnace, New Jersey surface outcrop at night under short wave UV light.

Crystals of franklinite (black) and willemite (orange) on calcite (white), New Jersey.

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Fluorescent calcite red, willemite green, with black franklinite, New Jersey.

Zincite crystal, New Jersey.

Zinc ore franklinite (black), zincite (red), willemite (orange/brown), calcite (white), New Jersey.

MARY ANNING 19TH CENTURY BRITISH PALEONTOLOGIST

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This is a new film about Mary Anning, who was an early 19th Century English paleontologist. At that time women, lower-class men, and minorities were effectively barred from science, which was an exclusive elite white Anglo Saxon men's club. Unfortunately, this movie had to fictionalize and exploit Mary as a lesbian to advance the movie producer's liberal agenda. Speculation that Mary was a lesbian because she never married seems to be important to many authors. Mary lived at a time when lower class married women had to work non-stop from dawn to dusk just to maintain the family. Mary would have known that marriage for a poor woman would have meant the end of her paleontology work. Perhaps that is the reason Mary chose to remain unmarried. I have also included here a more accurate and truthful discussion of Mary's contribution to science in the section titled: **Mary Anning, an Amazing Fossil Hunter.**

The expression "She sells sea shells by the sea shore" is believed to be a reference to Mary Anning. Britain's Natural History Museum has described her as the greatest fossil hunter ever known and, in 2010, the Royal Society included Mary Anning in a list of the ten British women who have most influenced the history of science.

Mary Anning and her field companion dog Tray. Notice her awkward field clothes and rock pick.

The new film 'Ammonite' Is Historical Fan Fiction About the World's First Great Fossil Hunter

By Riley Black smithsonianmag.com, August 26, 2020

Featuring Kate Winslet as pioneering paleontologist Mary Anning

Paleontology wouldn't be the same without Mary Anning. She scoured the dreary coast of southern England for secrets not seen since the Jurassic, fueling the nascent 19th-century field of fossil studies with evidence of strange sea dragons, flying reptiles and other fascinating fragments of life long past. And now, over 170 years after her death, she's got her own movie.

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Ammonite will open at the Toronto Film Festival but isn't set to premiere in theaters or in homes until later this year, but the historical drama is already stirring the waters like an excitable *Plesiosaurus*. The first trailer for the film hit the web yesterday. The tale, directed by British filmmaker Francis Lee, follows Anning (Kate Winslet) as she reluctantly brings a young woman named Charlotte Murchison (Saoirse Ronan) along on some fossil-hunting trips in the hope that the vigorous activity will help her new apprentice's illness. But the two find more than fossils. In Lee's telling, Anning and Murchison begin an intense affair that seems to have no room to breathe under the cultural strictures of Victorian England.

In other words, this is paleo fanfic.

The real Anning was an expert fossil collector and paleontologist who combed the beaches of Lyme Regis and the surrounding area for fossils that eroded from the Jurassic rock. You can retrace her steps on the same beaches, as I did during my own visit to England a few years ago, and maybe even find a little golden spiral along the tideline—ancient, shelled relatives of squid called ammonites.

Anning wasn't alone in her exploits. Fossil hunting was a family business, and Anning's father, Richard, took Mary and her brother Joseph on excursions to collect ammonites and other pieces they then sold as tourist curios. When Richard died, the rest of the family took over the business. And they were good at it. In 1811, Joseph found the gorgeous skull of an *ichthyosaurus*; Mary later collected more bones from the same animal. Of course, that's to say nothing of the Philpot sisters. Elizabeth, Louise and Margaret Philpot collected fossils in the Lyme Regis area when Anning was still a child, and Elizabeth became a mentor who encouraged her student to understand both the science and the market value of what she found. Even Anning's dog Tray, a black and white terrier, went along on fossil trips and would stay at specific spots to mark a fossil's location while the pooch waited for Mary's return.

Thanks to her discoveries, sketches and notes, Anning eventually became a rock star in her own right. It's at this point, when she had established her own fossil shop, that *Ammonite* finds Anning. But while Murchison really was one of Anning's friends, no evidence suggests that the two had any kind of romantic ties. In fact, no evidence of the paleontologist's love life—beyond her drive to keep digging into the Blue Lias strata that produced so many bones—exists at all.

Turning Anning's remarkable story into a torrid romance has already incensed some would-be viewers. Reactions have run the gamut from objections to historical inaccuracy and homophobia, with little resolution given that we're far too late to ask Anning herself.

In defending his choice, Lee snapped back against the anti-queer underpinnings of the outrage and said he sees *Ammonite* as another part of his efforts to "continually explore the themes of class, gender, sexuality within my work, treating my truthful characters with utter respect." Focusing on Anning's romantic life, even if entirely invented, is a way to see her as a whole person, not just the woman who sells seashells down by the seashore.

I have to wonder what Anning would say to this. As she wrote in a letter, "The world has used me so unkindly, I fear it has made me suspicious of everyone." In the sexist, male-dominated world of 19th-century science, Anning's finds were celebrated while she herself was barred from joining academic societies or even finding a path to gain equal footing with the likes of William Buckland, Gideon Mantell and other traditional heroes of paleontology who parasitized her labor. Now, in having her life's story made a fiction, is the world using Anning again?

In all the hubbub over *Ammonite*'s portrayal of Anning, commenters have continually missed a critical point. Anning never married, and we don't know if she had romantic or sexual relationships with anyone. Lee, and some others, have taken this as a hint that Anning may have been a lesbian and hid the fact to avoid controversy. But it's equally possible that Anning was asexual or uninterested in romance. Perhaps, then, *Ammonite* is an exercise in erasure wrapped in progressive packaging, ignoring what we know of Anning in an attempt to read between the lines. The truth died when Anning did.

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How audiences will experience *Ammonite* will largely depend on what they bring to it. If they're expecting a historically accurate biopic, they may sit back on their couch fuming. *Ammonite* is to paleontology what *The Untouchables* is to Prohibition or *Raiders of the Lost Ark* is to archaeology. If viewers are looking for a queer romance set against a wave-battered backdrop, they may feel a little warmer to the treatment.

The sheer pressure put on *Ammonite* to fulfill our fossiliferous expectations says something about our current moment in science. The accomplishments and importance of women in paleontology are far more prominent than they were in Anning's time, yet the standard image of a paleontologist remains an Indiana Jones wannabe focused on trophy hunting dinosaurs. And when it comes to diversity within the field across positions—from volunteer and student all the way up to professors—there remains a diversity gap that even cisgendered, straight, white women are fighting against, to say nothing of better support and representation for everyone else who falls outside those narrow categories.

And so we keep turning to Anning as a singular hero, a woman who made amazing and lasting contributions against the odds. She, and the women whose careers were intertwined with hers, deserves to be honored just like the men who fill the introduction sections of paleontology textbooks. At the same time, perhaps we are asking Anning to carry too much—to be the sole representative of an entirely different view of paleontology. If representation for women in the field were better, perhaps it would not feel as if so much is at stake. As it stands, we are so starved for stories other than the Great White Fossil Hunter that it's almost impossible for any tale to satisfy everyone.

If we're fortunate, some future paleontologist will be able to point to *Ammonite* and say it's the first time they got to see themselves represented. I hope so. For the time being, though, I'm looking forward to the evening when my girlfriend and I can curl up on the couch and watch a romance about warm hearts and cold stone, even if we know Mary Anning's truth requires a bit more digging to find.

Mary Anning, an Amazing Fossil Hunter

by Sarah Zielinski smithsonianmag.com January 5, 2010

We don't usually give much thought to who discovered a fossil. Museums rarely include much more information than species name and the state or country where the remains were found. The exception, in several museums in England at least, is fossils found by Mary Anning in the early 19th century. And two new books, one biography and one novel, bring her story to life.

Mary was born in 1799 in Lyme Regis, on the southern coast of England. Her father was a cabinetmaker who preferred to hunt for fossils, but neither occupation brought the family much money. When he died in 1810, he left behind a pregnant wife, two children and a large debt. Mary and her brother took to fossil hunting for survival.

Her brother found what he thought was a crocodile head in 1811 and charged Mary with removing it from the rock and searching for the rest of the skeleton. (Mary often gets credit for the discovery, though that is not technically correct.) She eventually dug out the skull and 60 vertebrae, selling them to a private collector for the handsome sum of £23. But it was no common crocodile. It was an ichthyosaurus, a "fish-lizard," and the first of many amazing finds.

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Plesiosaur found by Mary Anning.

Mary's brother would become an upholsterer, leaving fossil hunting to his sister. She would become one of the most prolific fossil hunters of the time, discovering more ichthyosaurs along with long-necked plesiosaurs, a pterodactyl and hundreds, perhaps thousands, of other fossils.

Though she had little formal education, Mary taught herself geology, paleontology, anatomy and scientific illustration. She corresponded with, provided fossils for, and sometimes hunted with well-known scientists of the time, such as William Buckland and Richard Owen (who would coin the word "dinosaur" in 1842). Her finds were key to the reconstruction of Earth's past and the development of the theory of evolution (as well as the development of several scientists' careers).

But Mary never published a scientific paper of her own—men wrote up her finds. Even if she had written one, it was unlikely that it would have been published because she was female. Mary was never wealthy. Until a friend convinced the British Association for the Advancement of Science to provide her with an annuity of £25 per year, she was always one accident away from total destitution. And though the Geological Society marked her 1847 death from breast cancer a year later in a president's address (a rare honor), the organization didn't admit its first female member until 1904. Even today many of her finds will never be associated with her name, the records lost long ago.

Mary is now emerging from history. The Natural History Museum in London, for instance, has made her and her finds the main attraction of their Fossil Marine Reptiles gallery. The Lyme Regis Museum stands on the site of her birth. She is the subject of several children's books. And the Geological Society has placed one of her ichthyosaur skulls and a portrait of her and her dog in their front reception hall.

A new biography, "The Fossil Hunter" by journalist Shelley Emling, tells Mary's story in detail for the first time. The book is detailed and well researched, drawing on Mary's own diaries when possible. And the story is captivating enough to forgive Emling for the slightly annoying habit of reconstructing her subject's hypothetical thoughts and feelings.

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Mary truly comes alive, though, in a novel published today: "Remarkable Creatures", by Tracy Chevalier, author of *Girl With a Pearl Earring*. Chevalier imagines Mary's life into her twenties, told through both her own point of view and that of a friend, the older Elizabeth Philpot. There are conceivable explanations for mysteries of Mary's life, such as why she never married and how one collector comes to sell all of his fossils and give the proceeds to Mary and her family. Chevalier knows how to tell a good tale, and her story of Mary is definitely that.

CONTRIBUTED BY: EUGENE CIANCANELLI

Milky Way over Joshua Tree

Wally Pacholka, Photographer

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Shop Suggestions

Compiled by Bernice D. Schilling - 1975 San Fernando Valley Mineral and Gem Society

"POLISHING POINTERS" SUGGESTED POLISH FOR VARIOUS STONES

CERIUM OXIDE on CANVAS for — Agate, Glass, Hematite, Howlite, Jasper, Opal, Rhyolite.

TIN OXIDE on LEATHER for — Alabaster, Amozonite, Amber, Aventurine, Coral, Datolite, Epidote, Feldspar, Fluorite, Gypsum, Labradorite, Lapis Lazuli, Malachite, Moonstone, Nephrite, Obsidian, Rhodochrosite, Turquoise, Veiriscite.

LIHDE A on LEATHER for — Apatite, Chiastolite , Cinnabar, Garnet, Jade, Peridot, Rhodonite, Tourmaline, Serpentine. LIHDE A on CANVAS for — Bloodstone, Hickoryite, Jadeite.

DIAMOND on WOOD for — Ruby, Sapphire.

LINDE A on FELT for -- S p i n el

LINDE A on CORK for — Topaz

TIN OXIDE on CORK for — Travertine.

When you are POLISHING WOOD LIMBS, instead of using Tin Oxide, use Tripoli for a glass - like polish at a lesser cost.

....The Polished Slab

.....Spit and Polish

POLISH HOWLITE on a felt wheel as leather will often stain Howlite.

....Arrowhead Chips

ORGANDY MATERIAL will sometimes put a polish on pieces of TURQUOISE that does not respond to FELT or RAG polish wheels.

....Diggers Digest

SPIC AND SPAN has OXALIC ACID in it, and is especially good in polishing mixtures.

. . . . Strata Gems

Have you ever had trouble trying to figure out JUST WHERE you were SANDING or POLISHING on a cab or facet??? Try using a WATER-PROOF FELT PEN — coat the area — sand or polish a little and you'll know EXACTLT WHERE YOU ARE!

....Rockhound's Rag

After POLISHING GEODES on your lap, etc., an easy way to remove the polish from those beautiful crystals — just use your DENTAL WATER PICK!!

....Bockhound's Rag

Monument Makers use a weak solution of Oxalic Acid to acquire the GLASSY SHINE ON GRANITE. Dissolve a little oxalic acid i n water and work into your felt buff, to add to your polishing paste. Try it on AGATES and other such stones.

....The Polished Slab

After lapping flat stones, such as cut thunder-eggs, with 600 grit, wash them and leave them under a HEAT LAMP or 100 watt bulb for about five minutes. When the stones are warm, polish them on a felt wheel with tin oxide. BY PRE-HBATIHG, THE POLISHING IS ALMOST INSTANT. Otherwise the felt wheel has to HEAT THE STONE before the polishing action begins.

....Breccia

Continued on Page VIII.....

NOTE:. It is not wise to use Tin Oxide on Rhodonite.

Bon Ami can he used as o mild abrasive for pre-polishing gemtstones.

....Boulder Buster Press **TUMBLING APACHE TEARS:** Use several successive stages of fine grit grinding, then normal polishing technique. It is necessary to fine-grind at a SLOW SPEED, so as to grind smooth without creating more cracks by fast tumbling. A filler, such as cork granules or small leather chips may be added to carry the polish, but slow speed is vitally important.

....Lapidary Journal

HOW TO POLISH MATERIAL WHICH WILL "UNDER-CUT"

Try the following procedure to get a better polish on materials that will generally "under-cut", such as sagenite, moss agate, plume, porous wood and wood with iron.

First, completely cover the slice with water in a flat pan with some detergent, and shake of Comet, elevating the slice in the water on a small object, such as a jar ring. Start the rocks in luke-warm water and gradually bring to a slow boil. Boll for 10 minutes keeping the slice well covered with water at all times. Remove from heat and leave in pan until the water reaches room temperature. Fast changes in temperature may fracture the slice. Shape stone and work through the fine sanding stage, clean well and spray with a coat or two of clear plastic. Let it dry, fine sand again lightly, then polish. The plastic fills in the porous spots, enabling the surface to take a polish. This thin coat over the iron content in picture wood almost eliminates the shiny iron streaks in the wood.

.... The Agatizer TO POLISH WONDERSTONE: In general, wonderstone should be worked in the same way as most stones that tend to under-cut. It is a rock and not a mineral. It is not always possible to get a high polish on all types of wonderstone. Sanding should be completed through the 600 grit paper. Polishing should be rapid to minimize under-cutting. Linde A is the best powder to use. Wonderstone is a very "loose term" and i s used to describe a variety of rocks, including so-called "sand-stone" and types of rhyolite.

....Chips and Facets

When polishing SAGENITE AGATE, put the most effort working with the direction of the lines of the inclusion, instead of across them.

....Chips and Facets

To polish SOFT STONES that under-cut, mix a small amount of tin oxide and cerium oxide in the palm of your hand, rub briskly and gently. It takes longer, but it is worth it.

....Strata Gems

IDEAS REGARDING PROBLEM OF UNDERCUTTING

When polishing cabochons that UNDERCUT, finish by the usual methods. Upon completion, and after removing from the dop-stick, wash and scrub the stone with ammonia. Then apply clear fingernail polish to the entire surface of the stone, and allow to dry for twenty-four hours. Once the stone has dried, it can be sanded with 600 g r i t sanding paper that is well-worn, and polished by the usual method.

....The Polished Slab

TO GET A HIGH POLISH ON OPALS

Raul Hidalgo owns an opal mine in Mexico and has worked extensively with opal. Mr. Hidalgo emphasizes three very importemt things. Your first enemy is HEAT, and the second is NOT *......* Continued from Page VII Continued on page IX......

VIII

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ENOUGH WATER. The third point, he says he can not stress enough, — the use of a 600 grit sanding belt that is completely WORN DOWN! A magnifying glass should be used frequently. Use CERIUM OXIDE and polish on a CANVAS WHEEL with a soft pad behind. The feature he uses which eliminates ANY POSSIBILITY OF OVER-HEATING is a "Paste Stick" which will bend if you are starting to heat the rock, as advance warning.

Use #100, #200, and #300 sandpaper, then go to #600, well worn-down so i t won't scratch. Use rubber behind the sandpaper disc and keep water dripping on it always. Keep the opal moving on the wheel — NEVER HOLD I T IN ONE SPOT!

Use the magnifying glass after each step to be sure all scratches are eliminated! Now 90% of the work is done. The last 10% is to finish with the polish, using a small disc.

.... Bell Notes...via Rocks and Gems

ALABASTER can be polished with a rag buff, using tin oxide and a little oxalic acid. The oxalic acid forms a hard film on soft materials such as alabaster, marble and travertine.

. Arrowhead Chips

Treat onyx by dipping cab into mixture of 3 tablespoons of water and $\frac{1}{2}$ teaspoon of oxalic acid. Then polish.

....The Polished Slab

Mix a tablespoonfull of Crisco with the same amount of Linde and apply it to a FELT POLISHING WHEEL or lap. Its viscosity prevents the powder from flinging off or traveling to the edge of the lap.

....Breccia

To achieve a good PR E-POLISH, try this little trick....

When you cone to the 600 grit paper, APPLY PUMICE to the paper, then proceed as usual. This enables you to attain the ultimate HIGH SHINS on the FINAL POLISH.

....Alaska Pebble Patter

POLISHING JADE

1. When using chrome oxide for polishing jade, mix it with half water and half vinegar.

....Rockhound's Bag

2. A little graphite mixed with chrome oxide and applied to ordinary muslin buffs makes a wonderful jade polishing agent. . . It works, also on some hard-to-polish agate.

....The Agatizer

WORKING WITH SILVER & GOLD

1. An excellent cleaner for silver and gold findings is a can of 7-UP. Dip findings, rinse well, rub with a soft cloth. Use separate solutions for gold and for silver.

....The Polished Slab

2. To antique silver jewelry. Paint the places to be darkened with RAW EGG YOLK. Rinse off the egg and rub high lights with Linde A.

....Del Air Bulletin

To rub smooth the high points of a gold or silver article, use sodium bicarbonate with a minimum of water.

....Del Air Bulletin

NOTE ON TURQUOISE: A touch of ammonia will brighten the polish on turquoise. Apply it, dry it and then buff the stone lightly.

....Gems

CONTRIBUTED BY: DIANE HALL

There are twelve birthstones for each month of the year; your birth month determines which applies to you. But a birthstone is more than that...it is a way for us to celebrate our birth into this world and our connection with the elements that gave us life. Each of the twelve primary birthstones have distinct characteristics and qualities – just like we do – and wearing them reminds us of who we are and where we came from, as well as inspires us to be who we dream of being and to go to the places we dare to go.

For people who love gemstones, no gift is more thoughtful or more appreciated than a piece of birthstone jewelry. Let us guide you on an exploration of the history and lore of the September birthstone, as well as some of the secondary stones, where you will abound in the mystical, the fantastic and the beautiful!

The September birthstone - Sapphire

Long before people understood chemical composition and could, therefore, classify gemstones into groups, species or variety, color was the primary trait used to group minerals. As a result there were very broad groups into which many gemstones with very different characteristics were lumped together. Sapphire is one of these gemstones.

The name sapphire comes via Middle French and Latin, and is mainly attributed to an Ancient Greek word, *sáppheiros*, meaning 'precious stone', though it may ultimately be traced back to a Sanskrit word, *sanipriya*, meaning 'dark-colored stone'.

It is this last point of reference that gives us a look at the very general methods of classifying gemstones in ancient times: the word sapphire was used to describe any dark-colored stone of value, usually lapis lazuli, azurite or the deep-blue corundum that typifies what we popularly think of when we see or hear the word sapphire.

However, as we know today, thanks to gemology, sapphires are not contained only to this color; in fact, they come in all colors across the visible spectrum – even grey!

The only color that does not apply to sapphires is ruby-red because those are...rubies (sapphire and ruby are in the same family – corundum).

So, while the word sapphire was used in ancient times to refer to a large body of dark-colored (usually blue) stones, it is today used to refer to a large body of colored corundum that ranges from orange hues to yellows, greens, purples and, of course, blues.

According to the Jewelers of America, who established the authoritative list of birthstones in 1912, sapphire is the official September birthstone.

And, while they do recognize that the deep-blue variety of sapphire is the most popular, they encourage you to choose from the wide range of colors when selecting a September birthstone for you or your loved one.

So, what are the colors of the September birthstone?

As previously mentioned, sapphire is the name of any color of corundum (aluminium oxide) except red; at least the blood-red that is strictly reserved for ruby. Though colorless sapphires are rare, they were once used as diamond imitations; today they are commonly used as accent stones (small, simple-cut stones set around a center stone to increase its brilliance).

Sapphires are split into two main color categories: the traditional (blue and colorless), and fancy (pink and purple, orange and yellow, green, black, etc.).

The most sought after fancy sapphire is the very rare padparadscha sapphire, a pinkish-orange sapphire named from the Sinhalese (a Sri Lankan language) for 'aquatic lotus flower'.

Unfortunately, there is no universal definition for the hues, tones and color saturation that define the padparadscha sapphire; therefore, the color that can be called padparadscha is open to interpretation, which can lead to conflict in the gemstone market, especially considering the very high price buyers are willing to pay for a true padparadscha sapphire.

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Fancy sapphires contain a sub-group of colors called parti-colored sapphires (or parti sapphires) that show combinations of different colors. Parti sapphires are created from sapphire crystals that have two or more distinctly different colors zones and are cut in a way that allows these zones to be part of a single gemstone. A common example would be an emerald cut parti sapphire that displays three zones: blue and yellow, with a greenish transition in between. Or a Pharaoh's Eye parti sapphire which is created by a yellow crystal core surrounded with blue, producing a kaleidoscope of blues, yellows and greens.

Some sapphires are known to exhibit a phenomenon called 'color-change'; though this effect is rare, the most common type of it is when a sapphire goes from blue in daylight or fluorescent lighting to purple under incandescent

light. Even more rare is the color-change sapphire which changes from green in daylight to reddish brown in incandescent light.

Color change is not to be confused with pleochroism, which is also exhibited by sapphires. Pleochroism is when a gemstone has different colors when viewed from different angles. Corundum is a pleochroic mineral and can show various different colors; for example, purple can show orange, blue can show light blue-green, and pink can show orange-red, among others.

Another phenomenon found in sapphires is the asterism, or star effect, usually appearing as a three-crossbeam, six-ray star pattern visible across a cabochon-cut stone's curved surface.

The asterism is a result of light reflecting off tiny needle-like inclusions and can occur in any color of corundum. The most valuable 'star corundum' are those with a color background that is strong enough to contrast the star pattern, and among these red and blue are the most sought after. Only the red asterism may be called 'star ruby', while any other colors may be called 'star sapphire'.

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History of the Sapphire

The Ancient Persians knew the sapphire as 'The Celestial Stone' and believed that the world rested on a giant sapphire pedestal that painted the sky blue with its reflection. The theme of sapphire as a connection with the divine and heaven continues through Ancient Greek and Roman mythology and into Christendom.

The Greeks associated sapphire with Apollo, the prophetic deity of the Oracle at Delphi. Worshippers seeking help and advice from the Oracle would wear sapphire to garner Apollo's favor and open their 'third eye', making it easier to understand the prophesy. Moreover, it was a commonly held belief among ancient Greeks and Romans that wearing blue sapphires would protect one from envy, infidelity and harm.

The Hebrew bible explicitly mentions sapphire 12 times and relates this gemstone to the Lord's character and divine nature.

There are numerous occasions where sapphires are placed under the Lord's feet, indicating that all the Lord does is based on the foundation of His divinity, reflecting the ancient beliefs that the word was supported by a sapphire pedestal.

There are many who believe that the blue stone tablets used to carve The Ten Commandments were sapphire and this notion is supported by what we know of the relative hardness of sapphire. On the Mohs hardness scale, sapphire is 9, making it an ideal surface to engrave with a hammer and chisel.

By the 12th century, sapphires had become closely associated with clergy, and ecclesiastical rings set with sapphire began to be worn by bishops and others to symbolize their direct connection with Heaven. A particularly special type of ecclesiastical ring would feature a star sapphire, for it was thought that the three crossbeams of the star represented the holy trinity: the Father, the Son and the Holy Spirit. Other Christians were inclined to call the star sapphire 'The Stone of Destiny' and attribute the three crossbeams to faith, hope, and destiny.

The Christian symbolism continued to permeate the cultural relevance of sapphire to such a degree that it was widely believed during the middle ages that a vessel made of sapphire would kill a venomous serpent if placed in it.

There are numerous myths and legends that surround sapphire that go back further in history than the Persians, Greeks and Christians. In the Hindu Vedic literature, widely considered the world's oldest religious scripture, the Kalpavriksha (or Tree of Life) reportedly had the fruit of rubies, the trunk of

diamonds, and the roots of sapphire. This imagery seems to be a possible origin for the Persian, Greek and biblical iterations of the concept of sapphire symbolizing an all-permeating supportive force in the universe.

Another ancient myth comes from the Khmer civilization, a people who inhabited what is today Myanmar. They tell of the Birman legend, a story in which a temple cat is transformed into a divine incarnation of the Golden Goddess called Tsun-Kyan-kse, whose prominent characteristics were blue sapphire eyes.

A fascinating Persian tale of the sons of the king of Serendip (the Old Persian name for Sri Lanka) recounts how the boys, who set out to discover the reality of the world, happened upon a sapphire mine. This legend accounts for the origin of the notion of serendipity - the occurrence and development of events by chance in a happy or beneficial way.

Today, Sri Lanka remains one of the most important sources of sapphires. Most of the world's sapphires come from the Australian territories of Queensland and New South Whales, Sri Lanka, Madagascar, Thailand, North America, Tanzania and other African countries.

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What is the significance of the September birthstone?

Sapphire symbolizes nobility, truth, sincerity, and faithfulness; hence its ageold appropriation by royalty who wished to embody and exemplify those virtues. Moreover, sapphire is believed to bring gifts of fulfillment, joy, prosperity, inner peace and beauty.

Traditionally, the power to bring harmony between lovers, as well as peace between adversaries, was attributed to the sapphire. Additionally, sapphires were said to bring calm to the wearer in uncomfortable social situations, as well as expose frauds. Anyone embroiled in a legal matter could benefit from wearing a sapphire piece of jewelry.

In astrology, the blue sapphire is connected to the planet Saturn and Saturday, while the white (or colorless) sapphire is associated with Venus and represents Friday, the day dedicated to that planet.

Sapphire's symbolism extends to springtime, as well, and in differing <u>zodiacal systems</u>, this gemstone covers both Taurus and Gemini.

Today, sapphire is still a stone of wisdom, learning, mental acuity and psychic activation. Its pure blue color is associated with order and healing of the mind, lending strength and focus, and an ability to see truths and to utilize that knowledge. The blue of sapphire represents the throat and third-eye chakras, which are the seats of communication and awareness, respectively.

It is thought that meditating with sapphire in your hand can help you get wonderful inspiration and ideas that'll support your creativity and expressions of power. Perhaps this is why many creators and artists prefer sapphire's properties and effects.

The notion of a sapphire engagement ring, which symbolizes sincerity and faithfulness, was made popular in 1981 when Prince Charles gave Princess Diana a blue sapphire engagement ring that she wore while she captivated the world. Today, that ring is proudly worn by Prince William's bride Kate Middleton. Many celebrities, including Penelope Cruz and Elizabeth Hurley, have followed this fashion of wearing a sapphire engagement ring, wedding them to the ancient virtues symbolized by this precious gemstone.

The healing properties of sapphires

When it comes to sapphire as the September birthstone, this gemstone is thought to have a special power for protecting those born in September.

The sapphire shields those born in this month against negative thoughts and brings a positive structure and order to their life.

Sapphire possesses strong protective properties which resonate on sacred spheres; virtually all religions in the world speak of the September birthstone with respect and awe. It makes an excellent protective talisman, especially when there's a risk of psychic, mental, or emotional attack.

This precious gem strengthens and awakens the link between the higher and the physical self. Wearing sapphire jewelry frequently helps you develop a stronger bond with your spiritual team, including the healing guides, spirit guides, guardian angels, and even passed loved ones. It can assist you in times of change by providing clearer visions you need to reach your dreams and complete your goals. Sapphire's power to transmute negative thoughts and energy also makes it highly effective for earth and chakra healing.

Regarding sapphire and physical health, this gem can improve your bone density, as well as overall strength. This excellent gemstone can also support good physical strength for people who've undergone reconstructive surgery where titanium is commonly used, promoting post-surgical healing while providing the energy to calm inflammation.

Sapphire can also be useful for those suffering from dementia or Alzheimer's disease. It helps them by stimulating both the pituitary gland and the thyroid gland. Moreover, it revitalizes the auric field and detoxifies the skin.

The September birthstone is also known for quelling fevers, stanching nosebleeds, reducing inflammation and curing infection. Many have reported positive results in using sapphire to heal burns. Overall, sapphire accelerates all healing processes by influencing the willpower to get well.

Taking Care of Your September Sapphire Birthstone

At 9 on the Mohs hardness scale, sapphire is the hardest and most durable gemstone after diamond. It has excellent toughness and no cleavage, which is a tendency to break when struck. This makes it a great choice for rings and other mountings subject to daily wear.

However, it still requires a little maintenance to prevent against the regular wear and tear it may experience after frequent, everyday use. As we all know, any jewelry can accumulate grime and dirt over time, making it look dull and unappealing.

Though sapphire is highly stable under normal conditions, meaning that it's resistant to the effects of heat, light, and common chemicals, boric acid powder will even etch the surface of untreated stones. Moreover, fracture-filled, cavity-filled, and dyed stones can be damaged by even mild acids like lemon juice.

A little care will go a long way in ensuring that your most cherished sapphire jewelry remains dazzling at all times. You don't need any special jewelry cleaner or polish to remove the dirt and filth from your sapphire. All you

need is adequate warm water to cover the piece, a soft toothbrush, and a mild de-greasing dish detergent.

Warm, soapy water is always safe. Ultrasonic and steam cleaners are usually safe for untreated, heat-treated, and lattice diffusion treated stones, while fracture-filled, cavity-filled, or dyed material should only be cleaned with a damp cloth.

Below is a comprehensive guide on how to wear, clean and store your precious birthstone of September:

- Wearing You're advised to wear your sapphire jewelry with care. The rule of thumb is to only wear it after you're through with your makeup. In so doing, your sapphire jewelry will remain safe and free from damage that may be caused by makeup products like hair sprays.
- When to remove the jewelry Always take off sapphire jewelry while doing such manual tasks as gardening, housework, or lifting. While sapphire is generally considered a hard stone, chances are that some manual activities can cause it to chip, scratch or shatter. If knocked by some of these manual jobs, your jewelry is likely to become loose and fall out of its setting. Why take that risk?
- Exposure Exposing sapphire jewelry to harsh substances containing abrasives, moisturizers or anti-static agents is not recommended. Harsh chemicals like chlorine bleach can damage

or discolor the jewelry or coat the stone with chemicals. For this reason, never bathe or swim with your jewelry – take it off when hand-washing clothes, cooking, or cleaning utensils.

- Cleaning You can safely clean your sapphire birthstone at home using warm water and a splash of mild degreasing detergent. It's also safe to gently scrub it with a soft toothbrush. After cleaning, rinse it thoroughly with clean water and dry with a soft cloth – air drying will leave spots. If the need arises, you can deep clean your sapphire jewelry by soaking it in lukewarm water for 10-15 minutes.
- Proper storage Once you've properly cleaned and dried your sapphire jewelry, wrap it in a piece of jewelry cloth, muslin cloth, or place it in an acid-free paper envelope. To prevent it from being scratched or scratching other stones, make sure to place it in a separate compartment inside the jewelry box. Always store jewelry in a cool, dry place away from heat or direct sunlight.

How much do sapphires cost?

Buying loose sapphires can be a lot of fun because there is so much to choose from; with dozens of color variations and effects, you are only limited by your imagination...and your budget. While price will depend on color, clarity size and weight of the gemstone, the type of treatment that it has had will be the primary factor in the cost.

Synthetic sapphire is something commonly found on the market and, though it is chemically identical to natural sapphire, its value is extremely low and is often used for costume jewelry. Reputable gemstone dealers typically do not sell synthetic sapphires.

Low cost natural sapphire tends to be mostly treated or lower quality material. Lower grade material is typically of inferior color or clarity. Some of the lower grade material of poor transparency is cut as <u>cabochons</u> rather than faceted. If the color is good, these can be very attractive, but they will sell for much lower prices than facet-grade stones. For example, one can purchase a 1.2 carat blue star sapphire cabochon, sized about 7 x 5 mm for \$20 only.

The most common treatment method for sapphire is <u>heat treatment</u>, which involves high-temperature heating that affects impurities in the sapphire, such as titanium or iron. The end result is often an improvement in both the color and clarity of the gem. Heat-treated sapphires with top color and clarity can be relatively expensive - though affordable - especially in large sizes. For example, a 3 carat oval orange sapphire, sized 8 x 7 mm could be purchased for \$750.

The rarest and most expensive sapphires are completely untreated. Sometimes they may be found at affordable prices in small sizes (under 1 carat), but <u>unheated sapphires</u> over 1 carat will generally be expensive. Large stones (over 2 carats) with very good color can easily sell for \$2000 per carat

and often more. Consider a 3.4 carat cushion blue sapphire, sized 9 x 6.7 with a price just over \$12,000.

Are There Any Secondary September Birthstones?

In the United States, the birthstone associated with September is the sapphire. In truth, however, there are six other stones that have been linked to this month of seasonal transition. Modern September birthstones came into existence in the early 20th century when gemstone societies from different parts of the world selected new stones for use as birthstones in jewelry.

One of the popular September birthstones is the lapis lazuli, which is an alternative to sapphire in the United Kingdom. It's been cherished by ancient kings and queens because it's revered for having the ability to calm and bring peace to a home. Lapis lazuli has a sacred connection to the heavens and starry skies, as well.

Other traditional September birthstones date back to the 15th century, when the birthstone color was of ultimate significance. Ancient Arabic, Russian, Italian, and Hebrew calendars listed peridot as the birthstone of September, albeit it is presently the modern birthstone of August. Peridot is associated with positive energy which opens up the heart of chakra, and thus clears blockages in your life.

Sardonyx was once the September birthstone in the Roman Empire, as well as modern Italy. It's thought to be a strong protective stone whose positive

vibrations can raise the levels of optimism, confidence, and joy. It also helps students to focus on learning and retain what they've learned.

Another popular September birthstone that's been held sacred in different cultures is the moonstone. It was considered a talisman of protection with a potent correlation to moon energy. It was believed to protect nighttime travelers, as well as open the heart to love and passion. Some cultures also considered it a stone that brings blessings of all kinds – heath, wealth, friendship, and more.

In ancient Tibet, the birthstone for September was agate. It was first found in the Achates River in Sicily, for which it is named. This ancient September birthstone can stabilize and strengthen the individuals who wear it.

Lastly, there's the Hindu September birthstone known as zircon. There are many zircon varieties in existence, but the blue version was considered the September birthstone on the Hindu calendar. The blue zircon helps you find inner peace by uplifting and balancing your mind and emotions.

Final Thoughts

Sapphire is practically the perfect birthstone. Not only are endless color varieties to choose from, the incredible durability of sapphire makes it ideal for any use in jewelry. People who have a September birthday are truly lucky to have such a meaningful and versatile birthstone!

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