

July 2008 Mineral of the Month: Stichtite

Our ongoing search for new minerals to feature finds us scouring the more than forty separate shows that comprise the Tucson Gem & Mineral show every year, looking for large lots of interesting and attractive minerals. The search is rewarded when we make a new contact and find something especially vibrant like this month's combination of lavender stichtite in green serpentinite!

PHYSICAL PROPERTIES

Chemistry: $Mg_6Cr_2(CO_3)(OH)_{16} \cdot 4H_2O$ Basic Hydrated Magnesium Chromium Carbonate (Hydrated Magnesium Chromium Carbonate Hydroxide)
Class: Carbonates
Subclass: Carbonates with hydroxyl or halogen radicals
Group: Hydrotalcite
Crystal System: Trigonal
Crystal Habits: Crystals rarely macroscopic; usually as crust-like aggregates in matrix; sometimes radiating, micaceous with flexible plates, and nodular with tuberos, irregular surface projections; also massive and fibrous.
Color: Lavender, lilac, light violet, pink, or purplish.
Luster: Waxy, greasy, sometimes pearly.
Transparency: Transparent to translucent
Streak: White to pale lilac
Refractive Index: 1.516-1.542
Cleavage: Perfect in one direction
Fracture: Uneven, brittle.
Hardness: 1.5-2.0
Specific Gravity: 2.2
Luminescence: None
Distinctive Features and Tests: Softness, color, crystal habits, occurrence in chromium-rich metamorphic environments, and frequent association with serpentinite (a greenish metamorphic rock). Stichtite can be confused with similarly colored sugilite [potassium sodium iron manganese aluminum lithium silicate, $KNa_2(Fe,Mn,Al)_2Li_2Si_{12}O_{30}$].
Dana Classification Number: 16b.6.2.2

NAME

Pronounced STICH-tite (the first syllable rhymes with "fish"), this month's mineral is named for American metallurgist Robert Carl Sticht (1856-1922), as detailed later in the write-up. Stichtite has also been called "kümmererite," "kammererite," "chrome-brugnatellite," and "chrome-serpentinite." European mineralogists refer to stichtite as "stichtit" and "stichtita." A gem variety of stichtite in serpentinite is marketed as "Atlantasite."

Serpentinite, pronounced SIR-pen-teen-ite, derives from the word "serpent," a reference to the similarity of its characteristic mottled green color to that of the skin of certain reptiles. Most collectors will refer to these specimens as "stichtite in serpentine," but being the purists we are, we must use the more accurate name "stichtite in serpentinite." It is our goal to be as precise and thorough as possible!

COMPOSITION

As shown by its chemical formula $Mg_6Cr_2(CO_3)(OH)_{16} \cdot 4H_2O$, stichtite contains the elements magnesium (Mg), chromium (Cr), carbon (C), oxygen (O), and hydrogen (H). Stichtite's molecular weight is made up

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of 22.30 percent magnesium, 15.90 percent chromium, 1.83 percent carbon, 56.27 percent oxygen, and 3.70 percent hydrogen.

Like all molecules, the stichtite molecule is composed of positively charged ions called cations and negatively charged ions called anions. Stichtite's compound cation consists of six magnesium ions (6Mg^{2+}) and two chromium ions (2Cr^{3+}) with a collective charge of +18. Its compound anion has two radicals (groups of atoms that act as entities in chemical reactions)—one carbonate radical [$(\text{CO}_3)^{2-}$] and 16 hydroxyl radicals [$16(\text{OH})^1$] with a collective charge of -18. This balance of cationic and anionic charges provides the molecule with electrical stability.

The “ $4\text{H}_2\text{O}$ ” in stichtite's chemical formula indicates that it is a hydrous (or hydrated) mineral with four attached water molecules ($4\text{H}_2\text{O}$) that are known as “water of hydration.” Water of hydration consists of complete, electrically neutral water molecules that do not affect the electrical balance of the parent molecule. Because water molecules have an unusual atomic configuration, with two hydrogen ions grouped together on one side of a large oxygen ion, they can “attach” to other molecules. The grouped hydrogen ions retain a small positive charge, while the opposite side of the molecule, which is dominated by the large oxygen ion, retains a small negative charge. This resulting polarity enables water molecules to act as dipole magnets that attach themselves to certain other molecules to form hydrous minerals in a weak attraction called “hydrogen bonding.”

Stichtite's chemical names, “basic hydrous magnesium chromium carbonate” or “hydrous magnesium chromium carbonate *hydroxide*,” indicate that it contains the hydroxyl radical $(\text{OH})^1$. From its formula $\text{Mg}_6\text{Cr}_2(\text{CO}_3)(\text{OH})_{16}\cdot 4\text{H}_2\text{O}$, we see that each stichtite molecule actually contains 16 hydroxyl radicals. As with water molecules, hydroxyl radicals exhibit polarity because the single, tiny hydrogen ion H^{1+} is dwarfed by the much larger oxygen ion O^{2-} . Hydroxyl radicals, however, do not behave like water molecules. Water molecules form hydrous minerals by attaching themselves to parent molecules with hydrogen bonding and do not affect electrical balance. But, hydroxyl radicals attach themselves by stronger ionic bonding to become an integral part of the molecule that affects electrical balance. Stichtite's 16 hydroxyl radicals provide a -16 charge that is vital to the electrical stability of the molecule.

As a carbonate, stichtite is a member of a mineral class in which one or more metallic elements combine with the carbonate radical $(\text{CO}_3)^{2-}$. Most of the nearly 100 carbonate minerals are quite rare. In fact, only three carbonates can be considered abundant: calcite [CaCO_3], our November 1996 featured mineral, also featured in our Club as calcite after ikaite in September 2003, and as calcite-replaced ammonites in October 2002; dolomite [$\text{CaMg}(\text{CO}_3)_2$], which we featured in January 2001 from Arkansas and in August 2002 from Zaire as the hot-pink cobaltoan variety, often mistakenly called cobaltocalcite; and aragonite [CaCO_3 , dimorphous with calcite], which we featured as clusters of brown pseudo-hexagonal crystals from Morocco in June 2000 and as needle-like crystals from the Northern Lights mine, Mineral County, Nevada in January 2004. Among the rarer carbonates we have featured are rhodochrosite [$\text{Mn}^{2+}\text{CO}_3$], from the Sweet Home mine, Colorado, in October 1997 and from the Uchucchacua Mine, Lima Department, Peru, in our 100th month of operation, June 2004; smithsonite [ZnCO_3], as green crystals from a new and exceptional find from the prolific mines of the Santa Eulalia District, Chihuahua, Mexico, which of course are no longer available; trona [$\text{Na}_2\text{H}(\text{CO}_3)_2\cdot 2\text{H}_2\text{O}$], also a new and exceptional find from Owens Lake, Inyo County, California; aurichalcite [$(\text{Zn},\text{Cu}^{2+})_3(\text{CO}_3)_2(\text{OH})_6$] from the Schell Creek Range, White Pine County, Nevada, in January 2003; callaghanite [$\text{Cu}_2\text{Mg}_2(\text{CO}_3)(\text{OH})_6\cdot 2\text{H}_2\text{O}$] from the Premier Chemicals mine, Nye County, Nevada, in January 2007; malachite [$\text{Cu}^{2+}2(\text{CO}_3)(\text{OH})_2$] from Zaire, in February 2002, and azurite [$\text{Cu}^{2+}2(\text{CO}_3)(\text{OH})_2$] from China in September 1996 and from Idaho in December 2004.

All carbonate minerals are built around the carbonate radical $(\text{CO}_3)^{2-}$, in which a central carbon ion (C^{4+}) is

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covalently bound to three equidistant oxygen ions ($3O^{2-}$). Simple carbonate minerals, such as calcite, consist of these triangular carbonate radicals bound ionically to metal ions. However, stichtite's chemical composition, with its double metal cation, compound anion, and attached water molecules, is considerably more complex. To visualize the stichtite lattice, first picture the basic carbonate triangle with its three oxygen ions. Two of these oxygen ions share electrons with two chromium ions, while the third oxygen ion is attached to four water molecules by hydrogen bonding. This creates the unstable, hydrous chromium carbonate radical $(Cr_2CO_3 \cdot 4H_2O)^{4+}$ that forms an octahedron. Six magnesium ions then bond ionically with 16 hydroxyl ions to form the unstable, pyramidal-shaped, magnesium hydroxide radical $[(Mg_6(OH)_{16})]^{4-}$. Alternating layers of octahedrons and pyramids then link together mainly by covalent bonding to achieve electrical stability and form the stichtite lattice.

Stichtite crystallizes in the trigonal system, which is similar to, and sometimes included in, the hexagonal system. Both systems have four axes of symmetry, three of which are of equal length and lie in a plane at mutual angles of 120° . The fourth axis is longer or shorter and at right angles to the other three. Hexagonal crystals exhibit a fourfold symmetry, while trigonal crystals, such as stichtite, have a threefold symmetry. Because the stichtite lattice is held together by directional covalent, omnidirectional ionic, and weak hydrogen bonding, cumulative bonding strength varies along layers and planes. One plane is dominated by weak ionic bonding to account for stichtite's perfect one-directional cleavage. Stichtite's atomic packing—the distance between its atoms—is loose and explains the mineral's very low specific gravity of only 2.2. And because atomic-bonding strength decreases with distance, stichtite's loose atomic packing also accounts for its brittleness and hardness of only Mohs 1.5-2.0 (softer than a fingernail).

Most carbonates are colorless or light-colored, but stichtite is an exception. As an idiochromatic (self-colored) mineral, stichtite's basic color is due to its essential chemical composition and the nature of its crystal structure, and not to the presence of secondary chromophores (coloring agents). Stichtite's characteristic and diagnostic lilac-purplish color is due to chromium, one of its essential components. Chromium is a strong coloring agent for greens, reds, and blues. In stichtite, trivalent chromium (Cr^{3+}) causes the crystal lattice to absorb all visible-light wavelengths except for reds and blues. The reflectance and transmission of these red and blue wavelengths combine to produce stichtite's lavender color. Impurities such as iron, aluminum, and manganese often create variations of this basic color.

In discussing the mineralogical genesis of our composite stichtite-in-serpentinite specimens, we begin with the serpentinite, which formed first. Serpentinite is not a formal mineral name, but a general term for rocks of the serpentine group which consist primarily of magnesium silicates with varying structures and habits. The three closely related serpentinite groups are based on the minerals antigorite, lizardite, and clinochrysotile, which are all polymorphs of basic magnesium silicate $[Mg_3Si_2O_5(OH)_4]$ and have similar mottled-green colors. Serpentinite forms in hydrous environments from low-temperature, multi-stage metamorphism of such ultramafic (iron- and magnesium-rich) rocks as olivines, pyroxenes, and amphiboles. Some mineralogists believe that smaller amounts of serpentinite can also form directly from the solidification of magma of serpentine composition.

Stichtite forms when chromium-rich serpentinite undergoes secondary metamorphism. In chromium-rich serpentinite, the chromium is present as disseminated grains of chromite [iron chromium oxide $FeCr_2O_4$] and magnesiochromite [magnesium chromium oxide, $MgCr_2O_4$]. Late-stage, low-temperature, long-term metamorphism of chromium-rich serpentinites will, under proper conditions of chemistry and temperature, alter the primary chromium minerals into stichtite.

The Dana mineral-classification number 16b.6.2.2 first identifies stichtite as a carbonate with hydroxyl or halogen cations (16b). The subclassification (6) defines it as a hydrous carbonate with hydroxyl or halogen cations that adheres to the general formula $A_mB_n(XO_3)_pZ_q \cdot 4H_2O$, in which "A" is magnesium, "B" is any

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trivalent metal, "X" is carbon, arsenic, or phosphorus, "Z" is a hydroxyl or halogen ion, and "p" and "q" are variables. Stichtite is next assigned to the hydrotalcite group (2), as the second (2) of four members. The other group members, all rare, trigonal-system minerals, include hydrotalcite [basic hydrous magnesium aluminum carbonate, $Mg_6Al_2(CO_3)(OH)_{16}\cdot 4H_2O$], pyroaurite [basic hydrous magnesium iron carbonate, $Mg_6Fe_2(CO_3)(OH)_{16}\cdot 4H_2O$], and desautelite [basic hydrous magnesium manganese carbonate, $Mg_6Mn_2(CO_3)(OH)_{16}\cdot 4H_2O$].

Many mineralogists believe that stichtite forms at least a partial solid-solution series with both hydrotalcite and pyroaurite. In the stichtite-hydrotalcite partial series, aluminum substitutes for chromium; in the stichtite-pyroaurite series, iron substitutes for chromium. Stichtite is also closely related to its polymorph barbertonite, which has an identical chemistry but crystallizes in the hexagonal system with fourfold symmetry.

COLLECTING LOCALITIES

Stichtite is a rare mineral with distribution limited to only about 14 localities worldwide, few of which provide collectible specimens. Our specimens were collected at Serpentine Hill (also known as Stichtite Hill and Tunnel Hill) in North Dundas, a section of the Zeehan district, Tasmania, Australia, the type locality and the classic locality for stichtite. Stichtite is also found at three other nearby sites: Nevada Creek, West Comet, and Birches Inlet. In Western Australia, stichtite occurs at the Mount Keith nickel deposit at Wiluna Shire.

In South Africa, the second most important source of stichtite, localities include the Murchison Mine at Gravelotte in the Murchison Range of Limpopo Province, and the New Amianthus, Kalkkloof, Munnik-Myburgh, Sterkspruit, and Stalzburg mines in the Barberton district of Mpumalanga Province.

Stichtite is found in Morocco at the Bou Azzer, Aït Hamane, Agouidal, and Aghbar mines in the Bou Azzer district of Ouarzazate Province; in New Zealand at the Maharahara copper mine at Manawatu-Wanganui on North Island; and in Russia at Saraovskaya in the Permskaya Oblast', Urals Region. Canadian localities include the Continental Mine in Coleraine Township in Mégantic County, and the Marlbridge No. 1 Mine in the Malartic district in Senneterre Parish, both in Québec. In the United States, micromount specimens occur at the Todt Hill serpentinite deposit on Staten Island in New York City.

JEWELRY & DECORATIVE USES

Stichtite-in-serpentinite has recently gained popularity as a gemstone. Although some Tasmanian stichtite was carved and sold in the 1970s, the availability of commercial quantities of rough and finished stichtite dates only to 1998. The softness of both stichtite and serpentinite make it an excellent medium for fashioning into cabochons, beads, figurines, spheres, and tumbled stones. Stichtite is easily shaped with hand tools and files, smoothed with abrasive papers, and hand-polished with grit compounds. Stichtite's gemstone appeal lies in the contrast of its lavender color against the green serpentinite. Although stichtite is too soft for mounting in rings, cabochons are worn in pendants and brooches and beads in necklaces and earrings. Stichtite's gemstone value is primarily dependent upon the amount of stichtite visible within the green serpentinite matrix and the intensity of its lavender color. A two-pound piece of top-quality, brightly colored stichtite rough sells for about \$45; polished cabochons of 1.5 inches sell for \$20. Gem-quality stichtite comes from Tasmania's Serpentine Hill and is marketed under the name "Atlantasilite."

Although stichtite specimens have only recently become available, they are already popular among collectors for their rarity, color, and association with green serpentinite.

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HISTORY & LORE

Stichtite was discovered in 1891 near the Adelaide silver-lead mine in North Dundas in the Zeehan District in northwestern Tasmania, Australia. A chemist at the Mount Lyell Mining and Railway Company's Queenstown copper mine at Queenstown, Tasmania, proposed that the specimens probably represented a new mineral species but was unable to positively determine their composition. In 1896, the prominent Tasmanian amateur mineralogist William Frederick Petterd (1849-1910) incorrectly described the lavender-colored specimens as chromium-bearing chlorite, a group of hydrous magnesium iron aluminum oxysilicate clay minerals, and named it "kümmererite." Although Petterd revised his description in 1910, this time correctly identifying the mineral as a basic hydrous magnesium chromium carbonate, he failed to publish his conclusions before his death that same year. In 1914, Tasmanian government geologist and chief mine inspector William Harper Twelvetrees (1848-1919) confirmed Petterd's analysis and published Petterd's findings posthumously. Twelvetrees formally named the new mineral "stichtite" after metallurgist Robert Carl Sticht, the general manager of the Mount Lyell Mining and Railway Company (see "Stichtite and Robert Carl Sticht"). The type locality in North Dundas became known as Serpentine Hill (also known as Stichtite Hill and Tunnel Hill), which is part of the Serpentine Hill geologic complex of outcropped serpentinite. At the time, Stichtite was thought to occur only in Tasmania, but another occurrence was found in South Africa's Barberton district in 1918. Only a few other localities have been found since.

Mineralogists used X-ray diffraction analysis to determine the atomic structure of stichtite in 1926. But while working with specimens from South Africa's Barberton district, they also found crystals with identical chemistry that exhibited hexagonal fourfold symmetry and were closely intergrown with trigonal stichtite. In 1940, mineralogists confirmed that this hexagonal polymorph of stichtite, named barbertonite after the South African type-locality, was a distinct mineral species. X-ray diffraction and electron-microprobe analysis have since revealed that virtually all stichtite is intergrown with small amounts of the very rare mineral barbertonite.

According to modern metaphysical belief, stichtite aids in controlling grief and emotional distress and promotes rational thought.

STICHTITE AND ROBERT CARL STICHT

Mineral names are most often derived from each mineral's physical and chemical compositions, its sources, or the names of individuals who have been in some way connected to the mineral or its localities, or to mineralogy in general. The stories of those individuals whose names are memorialized in those of mineral species are often interesting sidelights to history. This is the case with stichtite and the individual for whom the mineral is named—Robert Carl Sticht. Sticht received this honor not by discovering or identifying stichtite, but for his advancements in metallurgical smelting that profoundly affected mining in Tasmania and around the world.

Sticht was born in Hoboken, New Jersey on October 8, 1856. He studied at Brooklyn Polytechnic Institute in nearby New York City, then at the Royal School of Mines (now Clausthal University of Technology) in Clausthal, Germany. Returning to the United States in the 1880s, he headed west and worked as a chemist and metallurgist at several Colorado and Montana smelters. In 1893, after establishing a professional reputation as a smelting expert, he was approached by two directors of the Mount Lyell Mining and Railway Company of Queenstown, Tasmania, Australia, who explained that they had a very large and promising copper-gold-silver deposit at Queenstown on Tasmania's west coast, but had encountered serious smelting problems. Would Sticht come down and supervise their smelter operations?

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Eager to accept this new challenges, Sticht and his new wife Marian arrived in Tasmania in 1895, where he began a new career as chief metallurgist of Mount Lyell's Queenstown copper mine. The mine's open-pit and underground workings exploited ores grading on average two percent copper and .05 troy ounces each of gold and silver per ton. The profit potential was obvious, for each 100 tons of ore from this huge deposit, with efficient smelting, could yield as many as 40 pounds of copper and five troy ounces each of gold and silver. But the smelting was far too inefficient. In a cumbersome, energy-intensive, two-step procedure, Mount Lyell first roasted the ores to convert them to oxides, then reduced the oxides to metals in a blast furnace. This required great quantities of smelting coke (the destructive-distillation residue of coal), which was costly and not readily available on Tasmania's remote western coast. Another problem was the ore's high content of pyrite [iron disulfide, FeS₂]. Because no method then existed to separate pyrite from the valuable copper and silver sulfides, much coke was wasted in smelting the worthless pyrite component of the ores.

After studying the situation, Sticht realized that the pyrite itself was a potential source of heat that could displace the need for large quantities of expensive coke. Experimenting with various ore mixtures, he designed an efficient, inexpensive, simplified smelting method in which the rapidly oxidizing pyrite generated almost enough heat to drive the entire smelting process. Known as "pyritic smelting," this process revived the Queenstown Mine and the entire economy of Tasmania's west coast. By 1897, when Sticht was appointed general manager of the Mount Lyell Mining and Railway Company, dozens of mines around the world were already adopting his pyritic-smelting process. And by 1900, the Queenstown Mine was among the most profitable in Australia and generated more annual revenue than did the entire Tasmanian government. When stichtite was recognized as a new mineral species in 1914, it was fittingly named in honor of one of Australia's foremost mining men—Robert Carl Sticht.

While serving as general manager of the Mount Lyell Mining and Railway Company, Sticht concerned himself greatly with his employees' welfare and established medical, recreational, educational, and housing facilities far superior to those of other mines. He also helped found a mining school at Queenstown. Highly cultivated, Sticht was deeply interested in art, music, and literature, and over the years acquired an extensive personal collection of canvas art, early books, illuminated manuscripts, and engravings. After his death on April 30, 1922, in Launceston, Tasmania, many of his collections were bequeathed to public libraries, state museums, and the Royal Gallery of Victoria, Australia. A donation from his estate established the Robert Sticht Memorial Library in Queenstown, Tasmania.

By the time of his death, the introduction of the modern flotation-separation milling process that separated pyrite from other sulfide ores had made Sticht's pyritic-smelting process obsolete. But the Queenstown Mine, now renamed the Mount Lyell Mine, is still operating and has just recently mined its 120-millionth ton of ore. The memory of Robert Carl Sticht survives today in the continued success of the Mount Lyell Mine, his library and museum bequests, his place of honor in the Australian Prospectors and Miners Hall of Fame—and in the name of the mineral stichtite.

ABOUT OUR SPECIMENS

As noted, our stichtite specimens were collected at Serpentine Hill at North Dundas in the Zeehan district in Tasmania, Australia. Tasmania, Australia's "island state," is located 120 miles south of the southeastern tip of the Australian continent. With an area of 26,100 square miles, it is the smallest of Australia's six states and is roughly the size of West Virginia. Tasmania, which is named for Dutch explorer Abel Tasman who visited the island in 1642, was settled by the British as a penal colony in 1806.

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Geologically, Tasmania is an extension of the Great Dividing Range that runs the length of Australia's east coast from north to south and was once part of the Australian mainland. Tasmania became an island after rising sea levels at the end of the last Pleistocene Ice Age separated it from the continent between 8,500 and 13,000 years ago. Tasmania's most complex geology is found in its western and northwestern mining areas, where basement rock of billion-year-old schist is overlaid by sedimentary, metamorphic, and both intrusive and extrusive igneous rocks. Olivine-rich magmas intruded these formations some 600 million years ago to form dikes and sills of peridotite. Perhaps 200 million years later, tectonic stresses uplifted mountains and severely deformed this intruded strata. Associated mineral-rich hydrothermal solutions then surged into fractures and faults to form veins and replacement deposits. Eventually, surface erosion reduced these mountains, exposing veins of silver, lead, zinc, copper, tin, and gold ore minerals and a broad array of non-ore minerals.

The remarkably varied mineralization at North Dundas includes more than 100 mineral species, many of which, like stichtite, are quite rare. The unusual mineralization at North Dundas is due to a combination of rich chromium and lead mineralization, the accumulation of magnesium-rich dolomite sediments, and the metamorphism of ultramafic rocks into serpentinite. Abundant groundwater dissolved chromium and lead mineralization, redepositing it in zones of serpentinite that continued to undergo long-term metamorphism and oxidation. Among the many minerals that formed from these complex processes of metamorphism and oxidation, two have brought fame to North Dundas as a specimen source—stichtite and bright red crocoite [PbCrO₄], the latter as our Mineral of the Month in October 1996 and again in October 2006.

Prospectors who discovered the rich silver-lead ores of northwest Tasmania in 1880 founded the mining camp of Zeehan. By 1890, Zeehan had grown into a bustling mining center of 10,000 residents, where local mines produced more than \$1 million worth of silver and lead each year. North Dundas began attracting international attention as a source of superlative mineral specimens in the late 1880s, when miners started to recover quantities of spectacular crocoite crystals. The arrival of chemists and mineralogists to study the rare and more unusual non-ore minerals at North Dundas led to other discoveries, including that of stichtite in 1891 (see "History & Lore").

To explain the origin of our stichtite-in-serpentinite specimens, it is necessary to consider the origins of both the stichtite and the serpentinite. The serpentinite formed first from the metamorphism of olivine-rich peridotite rock. In our specimens, the composition of the serpentinite matrix varies, but consists mainly of the serpentine-group minerals lizardite and clinochrysotile, with lesser amounts of antigorite [all polymorphs of basic magnesium silicate, Mg₃Si₂O₅(OH)₄]. The variable composition of the serpentinite at Serpentine Hill creates two distinct color shades: a light "pistachio" green and a darker "forest" green.

At Serpentine Hill, the serpentinite was rich in disseminated grains of chromite [FeCr₂O₄] and magnesiochromite [MgCr₂O₄]. In a renewed phase of low-temperature metamorphism, highly alkaline (hydroxyl-rich), hydrothermal solutions altered these chromium minerals into zones of stichtite. Analysis has shown that these zones are formed around nuclei of residual, partially unaltered grains of chromite and magnesiochromite, and have replaced part of both the surrounding serpentinite and the original chromium minerals. Among the minerals associated with our specimens are magnetite [Fe²⁺Fe³⁺₂O₄], and pyroaurite [Mg₆Fe₂(CO₃)(OH)₁₆·4H₂O]. Stichtite remained an obscure mineral for more than a century after its discovery. After silver-lead mining in the Zeehan District finally faded out in the early 1960s, growing interest in, and soaring prices, for crocoite soon drew specimen miners back to the old mines. These miners included Tasmanian residents Mike and Eleanor Phelan, who bought the old Dundas Extended Mine to work for crocoite specimens.

Although concerned primarily with crocoite, they also explored nearby Serpentine Hill and began collecting stichtite specimens. In 1998, the Phelans showed their stichtite to a friend named Tom Kapitany.

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Immediately realizing stichtite's potential as an easily workable, attractive gemstone, Kapitany convinced the Phelans to acquire the mining rights to Serpentine Hill. Working together, the three have since opened a series of surface cuts and a room-sized, underground excavation. They now market stichtite as specimens, rough, and finished spheres, eggs, cabochons, beads, and figurines under the "Atlantasilite" name. A superb exhibit of their stichtite rough, jewelry, and carvings is now a major attraction at the Zeehan Mining Museum in Zeehan.

Although we have met Tom Kapitany on several occasions, we bought this large lot from another Australia dealership, who, although we requested photos in plenty of time, never got around to sending us any photos of the mine. Photos of the mining operation can be found at Tom's web site at <http://www.crystal-world.com/html/mining/australian/stichtite.htm>, including photos of metaphysical crystal-healing author Melody who visited and collected at the site.

Longtime mineral collector, dealer, and author Si Frazier reminisced with us about time he spent with Robert Carl Sticht's son, a geology professor at the College of the Pacific, telling us "I only knew Dr. Sticht and his wife from the perspective of an awe-struck adolescent mineral store clerk waiting on a couple who would step down off Mt. Olympus during a visit to Minerals Unlimited in Berkeley occasionally on a Sunday. I was 15 or 16 at the time and had been given the singular honor of keeping the store open all by myself on Sunday afternoons. About every other Sunday they would drive in from Stockton. Naturally I only knew them as Dr. Sticht and Mrs. Sticht. They were wonderful people who made my often rather lonely Sunday afternoons much more interesting than the boring jobs I had been assigned to busy myself with when not waiting on customers. I envy any student who had an opportunity to study under him. His wife was at least as impressive. She had accompanied Dr. Sticht on many adventurous trips and had lived in a lot of boondocks. I recall vaguely a story about her being the only woman on a trip up the Nile on a boat with hordes of native men and a very few white men. I really regret not having had a tape recorder or at least taking notes but I am not sure they would have been appreciated."

Both Si and his wife Ann have been very encouraging and informative to us, ever since we told them about our idea for Mineral of the Month Club years ago. We feel about them the way he felt about his interactions with Dr. Sticht, the way we should all feel toward those older or more experienced than us—opportunities to learn from them will not last forever, and should be treasured as much as possible! Doesn't knowing a little about Robert Carl Sticht enhance your appreciation for this month's mineral?

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